JULY 1936

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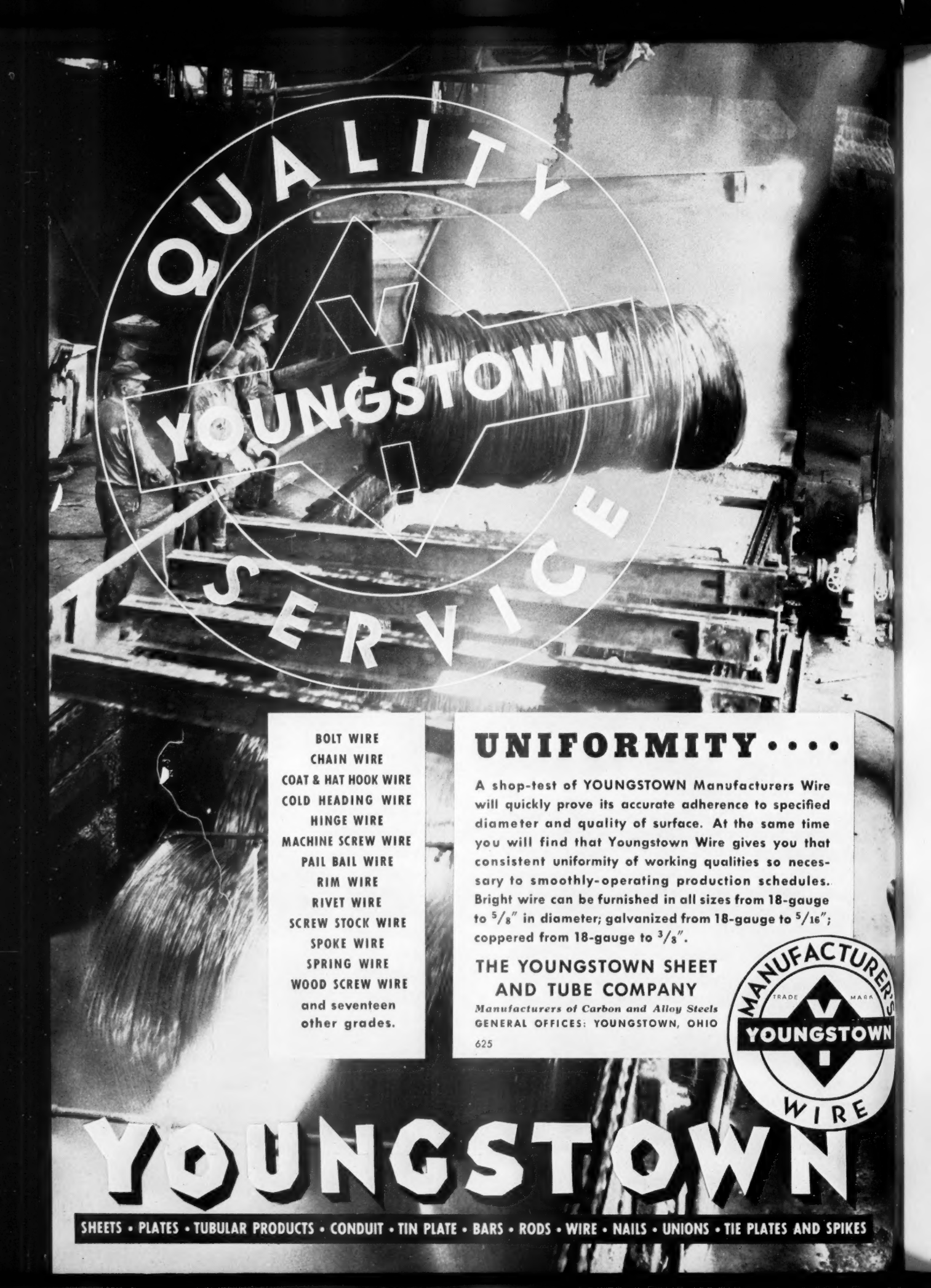

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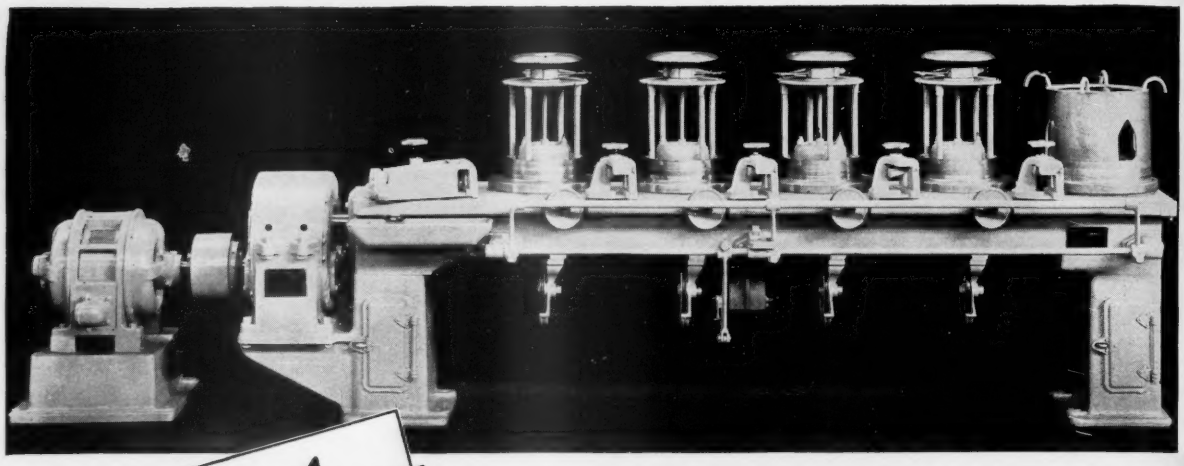

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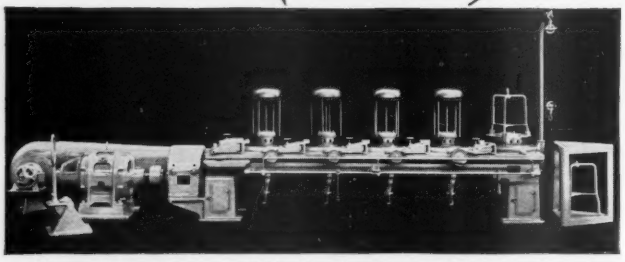

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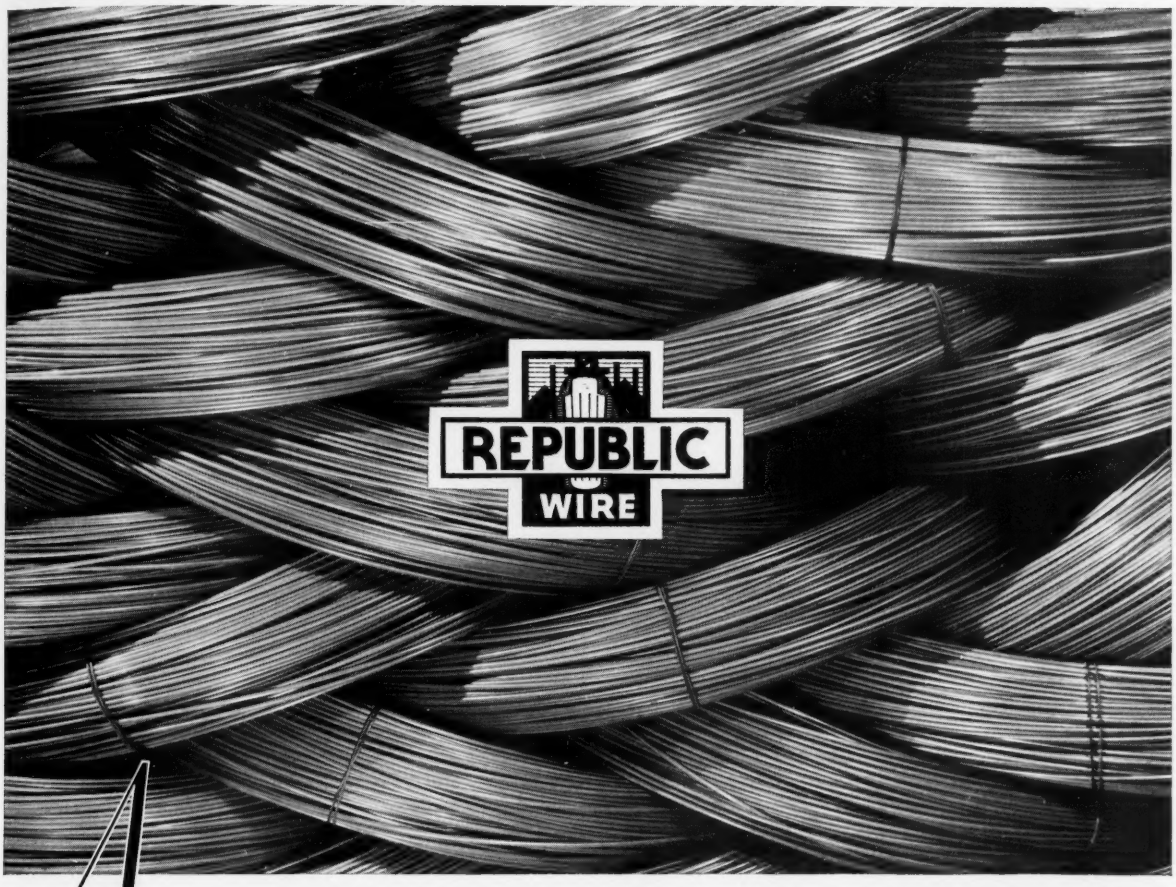

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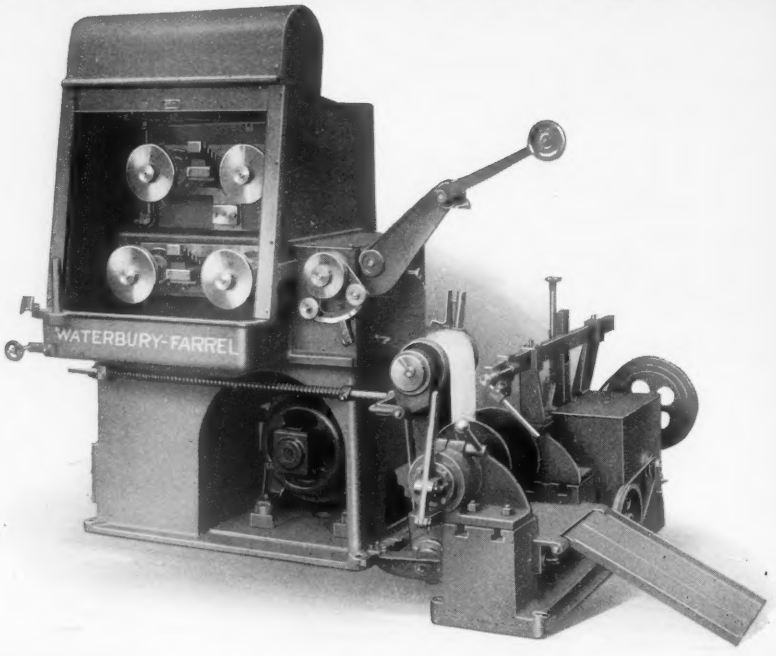

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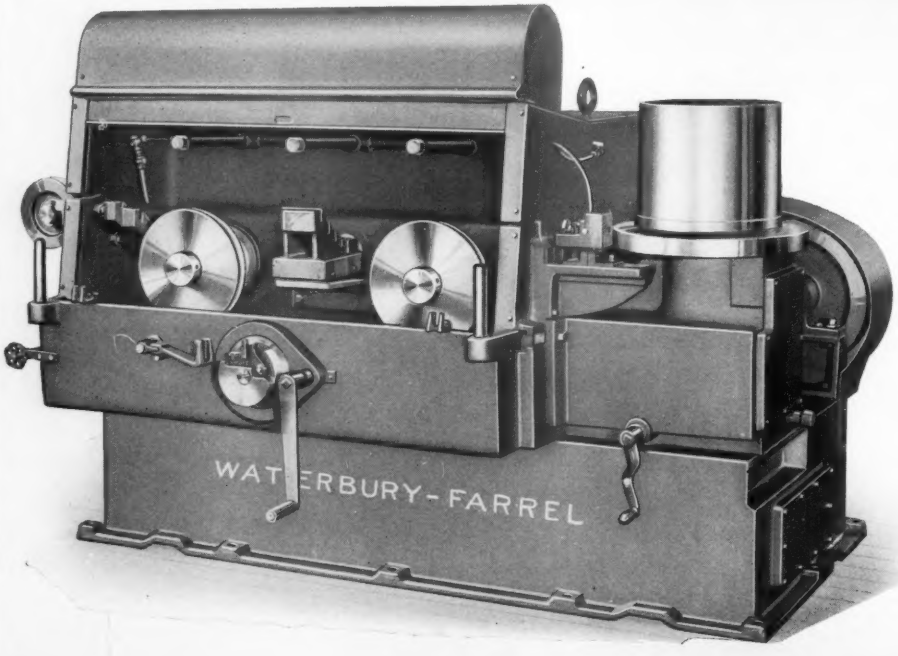

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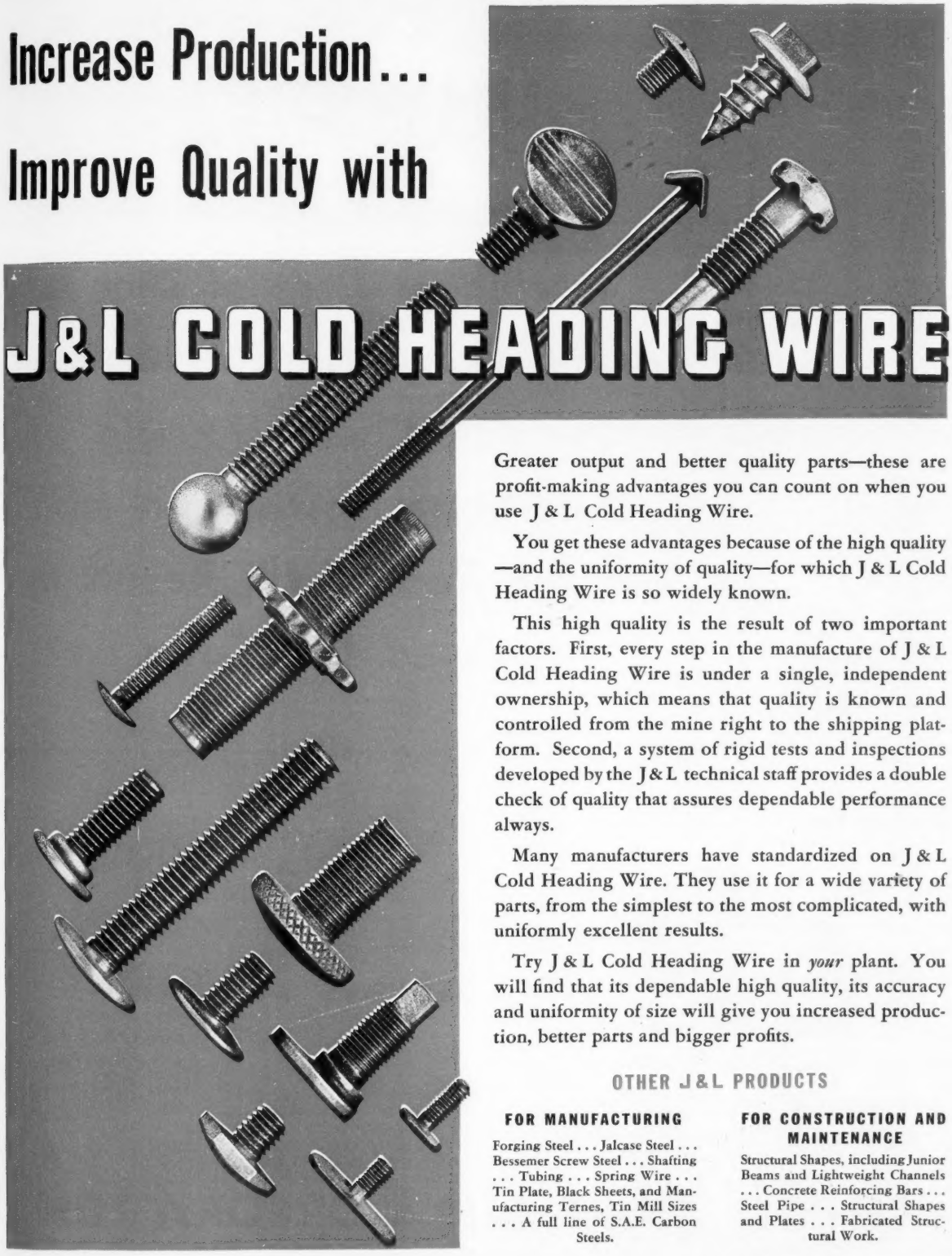

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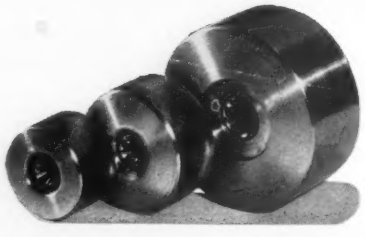

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A monthly publication devoted to the production of Wire, Rod and Strip Wire Products and Insulated Wire and Cable

DRAWING—ROLLING—EXTRUDING—FORMING—FABRICATING

Vol. II July 1936 No. 7

Designated as
Official Publication By The Wire Association

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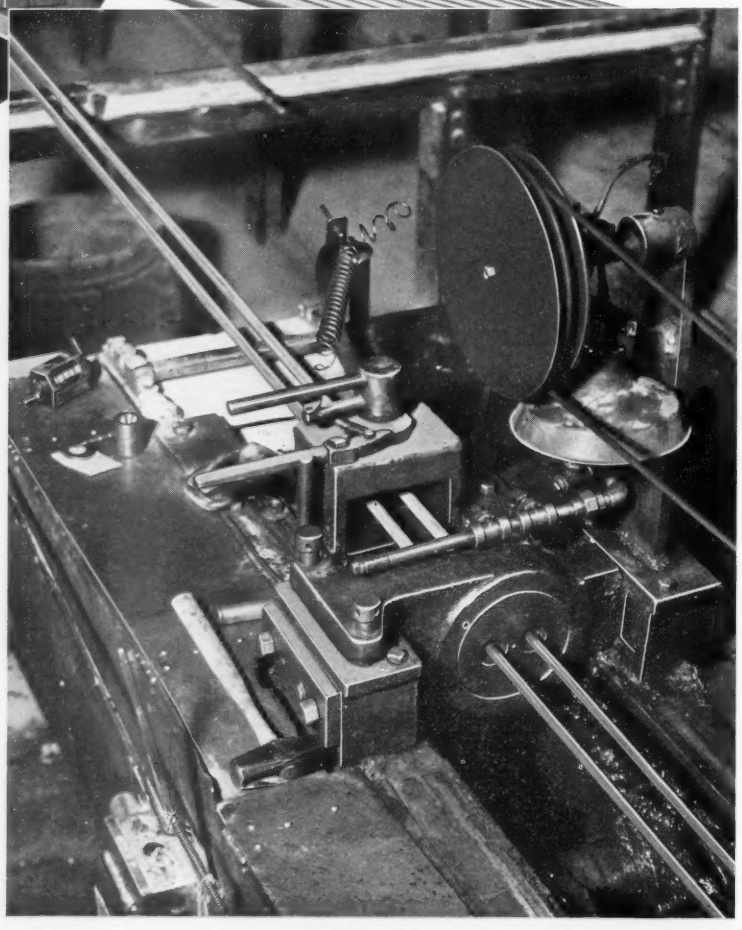

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A monthly publication devoted to the production of Wire, Rod and Strip.
Wire Products and Insulated Wire and Cable.
DRAWING --- ROLLING--- EXTRUDING --- FORMING --- FABRICATING

Vol. 11 JULY 1936 No. 7

Recent Developments In Steel Wire Technology

By S. A. Braley*

A study of the fundamental questions for which satisfactory information must be obtained in order to produce proper types of specification wires. The necessity for correct rod rolling to meet required wire properties emphasized. ✦ ✦

IN the past few years many important developments have been taking place in the steel wire industry. Formerly wire was used largely for nails and barbed wire or woven fence on which little or no conformance to specifications was demanded. With the extension of the applications of wire in manufacturing and fabricating, however, definite and rigid specifications became more prevalent. The automotive industry has in a large measure been responsible for this change. The importance of bolts, spokes and cotter pins in the production of automobiles and trucks is so well demonstrated that the requirements for uniformity and strength therein are essential.

✦ ✦ ✦

THE growth of the automotive industry and the resulting keenness of competition have led to more rigid requirements for all other types of manufacturers' wire. The fabricator, because of competition and requirements forced upon him, has found it necessary to pass this problem on to the wire manufacturer in order that he may cut his losses during fabrication and at the same time meet his customer's specifications for quality. These requirements have caused the task of the steel manufacturer to become more and more difficult. Only one course of action has been open to this manufacturer, and that is to obtain basic processing information and then to set up standards of control, so that he may ensure his customers that the quality conforms to specifications and is always uniform. Necessarily, this control must be accomplished at a minimum of cost to the manufacturer.

S. A. BRALEY

Received A. B. degree at Morningside College in 1913, A. M., University of Illinois 1915, PhD., University of Illinois 1917. Instructor and Assistant Professor of Chemistry, University of Illinois 1917-1927, Pittsburgh Steel Company Fellowship at Mellon Institute of Industrial Research 1927 to date. Member, American Society for Metals, Wire Association.

✦ ✦ ✦

THE investigation of the problem confronting the manufacturer of steel wire may be divided into the following stages:

(1) chemical composition,
(2) crystal structure,
(3) physical properties, and
(4) surface condition or finish.

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Chemical Composition

LET us consider what can be done to correlate the specifications relating to these factors. Chemical composition, of course, must go back to the open hearth; it is largely dependent upon efficient melting, selection of charge, and control of tap. The use of the carbomometer aids materially in maintaining a carbon content within very close ranges, but selection of the charge is extreme-

*Pittsburgh Steel Company's Industrial Fellowship, Mellon Institute of Industrial Research, Pittsburgh, Pa.

ly influential on composition. The scrap charge is of particular importance inasmuch as a great deal of scrap is high in non-ferrous constituents, such as copper, nickel, chromium, and molybdenum, and these elements affect not only crystal structure but also the ultimate physical properties of the material. Again, composition determines the type of mold and the method of pouring in order to prevent segregation and to produce proper surfaces for subsequent rolling and drawing. This fact applies particularly to open or rimmed steel, which, under the best of conditions, gives a large difference in carbon content between top and bottom of the ingot. While only in a few cases may this difference be important in specifications for analysis, it becomes very important when drawing wire to rigid physical values. It then is the function of the metallurgical or research department to determine the effects of the various practices and the limitations that may be expected.

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AS there is such a close relationship between the physical properties of the wire and the percentage draft from the rod, depending upon the analysis of the steel, it is imperative that this information be available, so that the correct rod size may be rolled which upon drafting produces the required properties. The latter cannot be based on the number of thousandths difference between rod and wire, inasmuch as .050″ draft on a .500″ rod is 19.0%, whereas .050″ draft on a .250″ rod is 36%.

TABLE A

Analyses of Steel				Tensile, lbs.	Yield-point, or
Car.	Man.	Phos.	Sul.	per sq. in.	proportional limit
.20	.60	.015	.030	65,000	42,250
.06	.30	.015	.027	65,000	58,000

Therefore, in order to obtain the same properties from a .250″ rod, it must be drafted to .225″, or a reduction of .025″.

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FURTHERMORE, if steels of the following analysis

	I	II
Carbon	.20	.06
Manganese	.60	.30
Phosphorus	.015	.015
Sulfur	.030	.027

are each drafted from a .500″ rod to a .450″ wire, they will produce tensile strengths of 80,000 pounds per square inch and 60,000 pounds per square inch, respectively; whereas if they are drafted from a .250″ rod to .200″ wire, they will produce wire of 90,000 pounds per square inch and 70,000 pounds per square inch, respectively. However, if the low carbon steel is drafted from a .250″ rod to .200″ wire, producing a tensile of 70,000 pounds per square inch, and the higher carbon is annealed in processing and given a draft after annealing from a .210″ to .200″ wire, it also will produce 70,000 pounds per square inch tensile. These data indicate the necessity of accurate rod size control and proper specification of rod sizes, depending upon the specific properties desired in the wire.

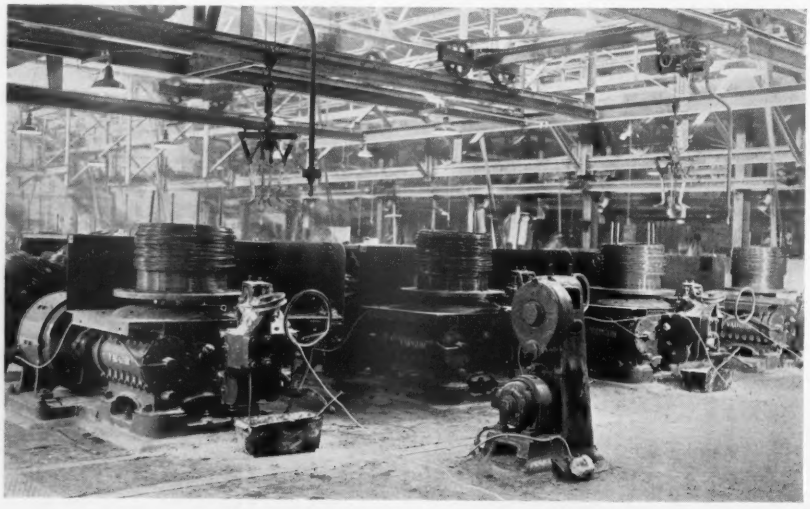

Fig. 1. Section of Wire Rod Room. Pittsburgh Steel Co.

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Grain Size and Crystal Structure

MUCH has been written of late regarding grain size and crystal structure, and their importance is fully appreciated in most metallurgical circles. Here again we have fundamental questions of open-hearth procedure, and hence proper control must be set up and rigidly adhered to if required specifications are to be met.

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DESIRABLE physical properties are of extreme importance to the fabricator and their uniformity is equally essential. The problem of meeting such specifications within narrow limits and at the same time meeting a narrow chemical specification is worthy of consideration. As the physical properties specified are usually tensile, yield, elongation, bends, and hardness, they must be correlated with the drafting procedures and their relationship thereto must be determined.

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FOR the purpose of this discussion, only low carbon steels will be given attention. The relation between tensile and yield point is rather definite in that the yield point on low carbon steels in the hot-rolled or annealed condition is approximately 65% of the ultimate tensile. But if a hot rolled rod is given a 15% draft, the yield point immediately becomes 85% or more of the ultimate tensile; and if given a 20% draft, about 90% of the ultimate. Even though extreme drafting may be given the material up to 90% or 95%, the yield point will change only slightly and rarely goes over 95%.

AS an example of these conditions, results may be obtained as shown in table A.

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THESE properties are plainly important in various forming operations where definite ultimate strength requirements are specified. The higher carbon material will form more easily and will have the same ultimate strength as the low carbon material. These properties and others correlated therewith must be considered in producing cold heading stock, particularly where severe upsets are demanded.

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THESE apparent discrepancies are many times responsible for misunderstandings of the meaning of "temper." This term is applied to ultimate tensile, to yield point, stiffness or analysis, as well as to hardness, and becomes, very confusing. In fact "temper" has been used to explain the short life on certain forming dies when the finish of the wire was entirely responsible.

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THIS condition, then, relates to the preparation of the rod for drawing and lubrication of the die during drawing. The importance of rod preparation cannot be neglected in the production of finishes. Careful control of acid concentration, iron concentration and temperature in the pickle house are essential. In a recent article Lewis[1] has discussed the value of inhibitors and their application to present-day pickling practice. Too much importance cannot be attached to their use.

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THE question of lime is also a large factor in preparation. The particular type of lime, its composition and concentration in the bath, as well as its temperature, are every day becoming more important as requirements of finish become more and more rigid.

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THE lubrication of the die determines the finish and in many cases the physical properties of the wire, inasmuch as some required finishes will not permit of the drafting necessary to produce the correct physical properties.

[1]Wire and Wire Products, II, No. 3, 127.

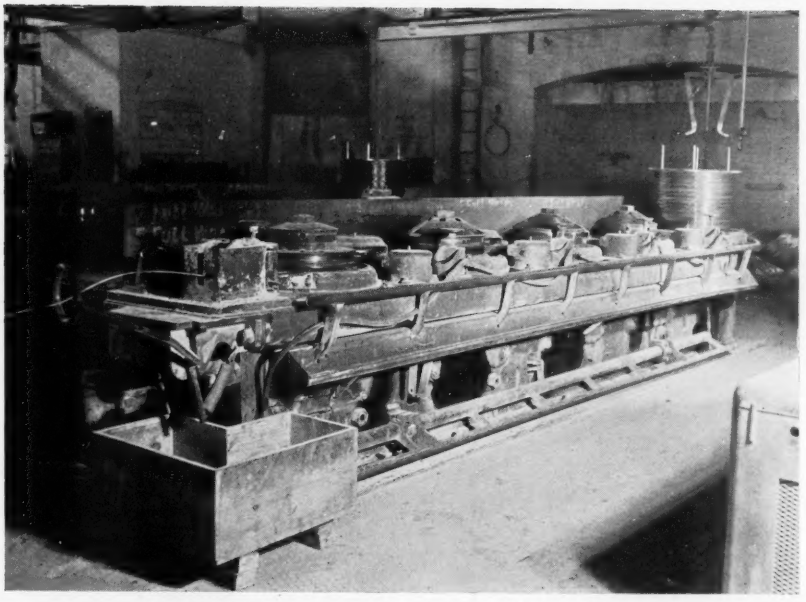

Fig. 2. Continuous Drawing Machine. Pittsburgh Steel Co.

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IN preparing a lubricant for a given material, the amount of draft, the analysis of the steel, and the speed of drafting must be considered. The function of the lubricant is to prevent a metal to metal contact in the die and thus prevent adherence of the wire surface to the die face causing galling or scratching. It is reasonable to conceive that the thinner the interfacial film, the greater the polishing action and hence the brighter the wire. Likewise, the thinner the film, the greater is its tendency to rupture and permit metal to metal contact and cause galling. Similarly, if the wire is very bright, indicating a very thin lubricating film, it is not expected to hold up during further working and hence is not satisfactory for extrusion work on roll thread bolts. For work of this kind, a heavy film must be apparent on the wire and of such nature that it does not become "sticky" at the working temperature of the extrusion die. It must also be of

(*Please turn to page 350*)

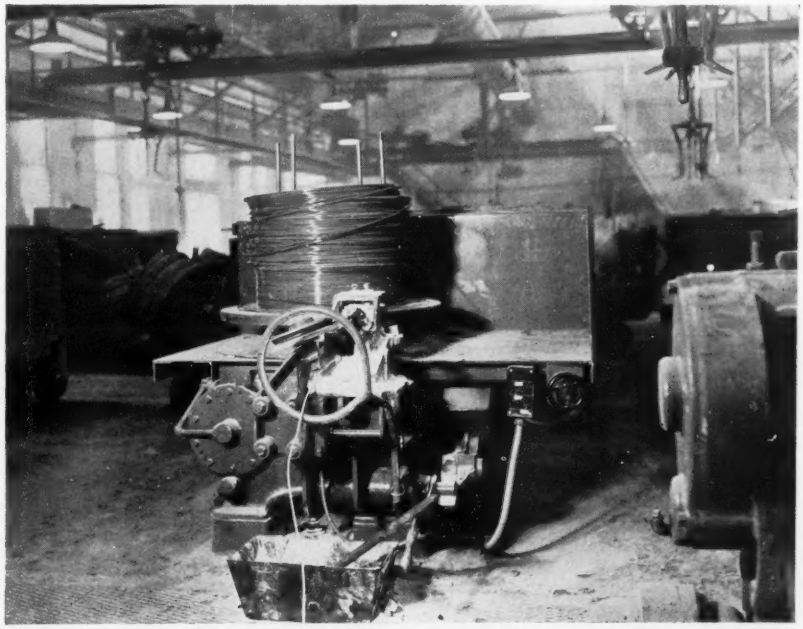

Fig. 3. Heavy Drawing Machine. Pittsburgh Steel Co.

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Beryllium-Copper Wire Has Unique Characteristics

By Jack Delmonte,
Electrical Engineer, East Lansdowne, Pa.

The improvement of the electrical characteristics of the Beryllium-copper alloys outlined. The development of these alloys has made available new materials outstanding in electrical and mechanical characteristics. Recent price decreases have placed the material within the range of commercial tonnage production for wire. ✦

THE development of beryllium-copper alloys has made available new materials outstanding in electrical and mechanical characteristics. As a metal, beryllium does not have much practical value, as it is too brittle and hard to work. However, as an alloying medium to copper it is unique; to the extent that it is frequently remarked that beryllium has done for copper what carbon has done for iron. Before discussing the remarkable properties of beryllium copper, the one outstanding disadvantage of the alloy must be brought to light. Beryllium costs in the neighborhood of $40 a pound. This price has been steadily dropping within the last few years, and there are all indications that the bottom price is not in sight yet. Despite this economic handicap, applications of beryllium - copper have been increasing. In many cases the increased saving and utility of beryllium - copper, more than justified a high initial cost.

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BERYLLIUM-copper contains 2 to 2.5% beryllium and the remainder copper. Sometimes 0.25% nickel has been added to refine the grain structure, for a slight improvement in mechanical characteristics, accompanied by a slight decrease in electrical conductivity. Beryllium-copper is the highest strength copper alloy available, attaining its outstanding characteristics through work hardening and heat treatment. To anneal the metal it is necessary to heat to 800°C., and then quench. Typical physical properties of beryllium-copper alloy are given in Table I.

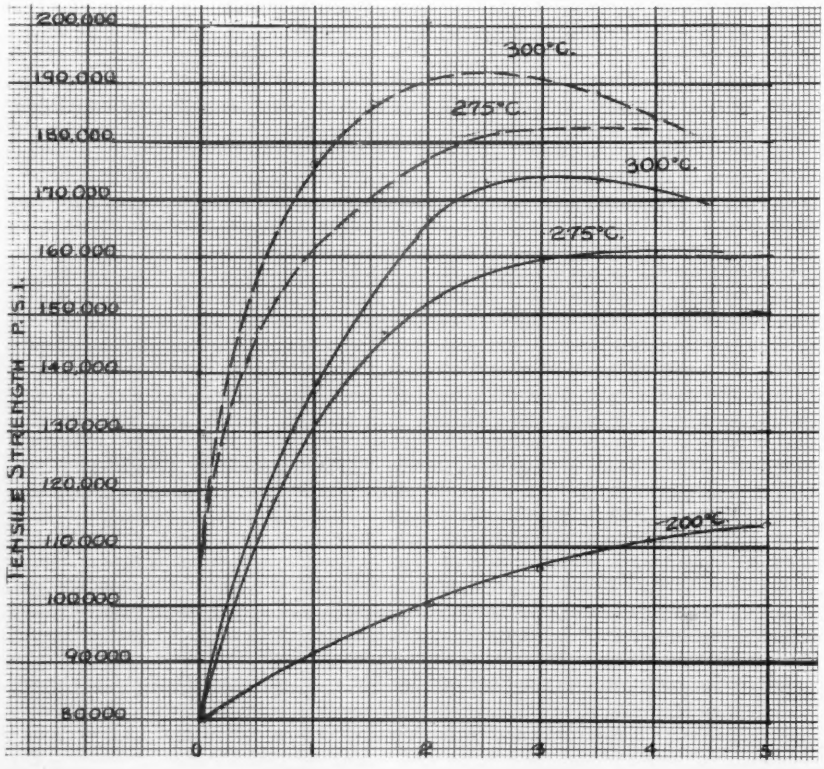

Figure 1. — Time in Hours.
Heat Treatment of Beryllium-Copper (2.0% Be). Solid Lines — From Annealed State. Dotted Lines — From 2 Nos. Hard. ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦ ✦

SUBSEQUENT heat treatment improves beryllium-copper, as reference to Figure 1 will indicate. The peak value of tensile strength obtained from heat treatment from the soft annealed state is 175,000 pounds per square inch; while the peak value of tensile strength after heat treatment from the work hardened condition is 193,000 pounds per square inch.

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Electrical Conductivity

OF great importance are the electrical characteristics of the beryllium-copper alloys. They exhibit better electrical conductivity than any other common, copper alloy. For the basis of comparison, the International Annealed Copper Standard (IACS) will be represented by 100% conductivity. This is equivalent to a resistance of 10.371 ohms per mil foot or 1.724 microhm - centimeters. The effect of small quantities of beryllium upon the conductivity is shown in Table II for various annealing conditions.

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THE market reduction of conductivity of copper is apparent not only for beryllium, but also for the great majority of metals when

small quantities are added. What are of more practical significance are the data given in Figure 2, which shows the effect of the time of heat treatment upon the electrical conductivity of beryllium-copper. This period of heat treatment should not be applied promiscuously, as it must be borne in mind that prolonged heat treatment, while not only costly due to the large expenditure of energy, is also detrimental to the mechanical qualities of the alloy. The merits of the particular application should decide the specific heat treatment. Prolonged heat treatment at 275° Centigrade may be better than at 300°C., when it is desired to obtain good electrical conductivity, and still retain high mechanical strength; as it takes a longer period of time to reach maximum strength at the lower aging temperature.

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FIGURE 3 shows the effect of wire drawing (cold drawn) and heat treatment upon the conductivity and the tensile strength of 2% Be-copper wires. A high value of 40% conductivity is approached on wire drawing the heat treated wires, which is not easy, as the wires are no longer ductile. This high electrical conductivity is not duplicated by other copper alloys.

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IT remains to point out the potential applications of beryllium copper, where the superior mechanical and electrical characteristics may be utilized to the best advantage. Beryllium-copper is admirably suited for small electrical parts requiring good conductivity and high strength, such as contact clips, relay springs, instrument springs, shunts, contact arms, relay parts, etc. It is superior to phosphor bronze, which is ordinarily used in such applications, as follows:

	Phosphor Bronze	Beryllium-Copper
Tensile Strength p. s. i.	95,000	190,000
Fatigue Limit p. s. i.	27,000	40,000
Conductivity % I. A. C. S.	7 to 10%	30%

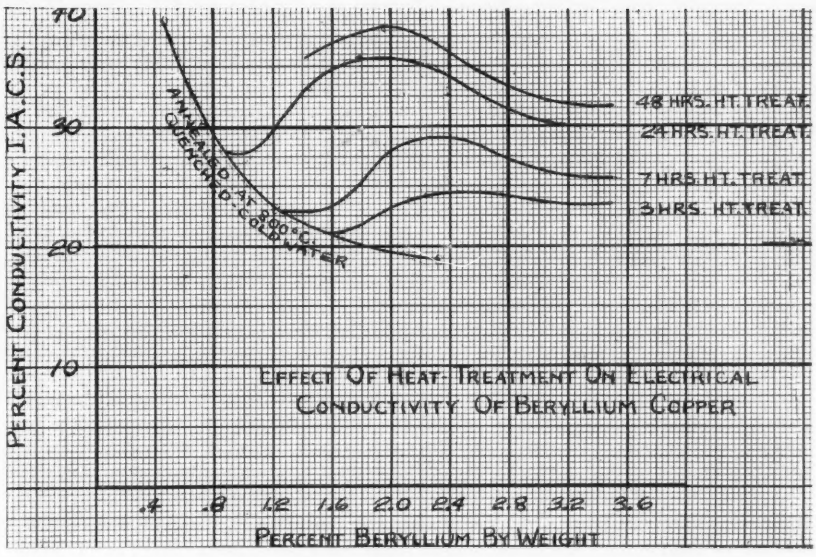
PERCENT CONDUCTIVITY I.A.C.S.
48 HRS. HT. TREAT.
24 HRS. HT. TREAT.
7 HRS. HT. TREAT.
3 HRS. HT. TREAT.
EFFECT OF HEAT TREATMENT ON ELECTRICAL CONDUCTIVITY OF BERYLLIUM COPPER
PERCENT BERYLLIUM BY WEIGHT

Figure 2.

TABLE I

Physical Properties of Beryllium-Copper

Property	Soft-Annealed	Heat-Treated	Work-Hardened	Heat-Treated
Yield Pt. (p. s. i.)	31,000	134,000	105,000	138,000
Tensile Strength	80,000	175,000	118,000	193,000
Elongation (% in 2")	45%	6.3%	4.5%	2.0%

TABLE II

Effect of Small Amounts of Beryllium on the Conductivity of Copper.

Percent Beryllium (by weight)	Percent Conductivity of the I. A. C. S. Annealed in Air 800°C., 1 hr.	Hard Drawn	Annealed in H_2 800°C., 1 hr.
0	100	97	92.5
.01	98	95.5	97.0
.02	96.5	93.5	95.5
.04	93	90	92
.06	89.5	86.5	88.5
.08	86.0	83.0	85.0

BERYLLIUM-copper is desirable in spring applications, and is surpassed only by high grade

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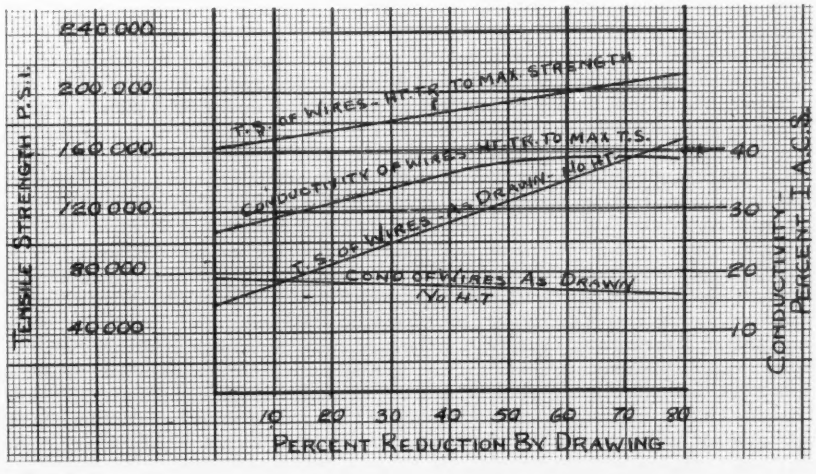

Figure 3.

Waste Acid Disposal

By Kenneth B. Lewis,
Consulting Wire Mill Engineer,
New York, N. Y.

A discussion of some problems encountered in the disposing of waste acid by wire mills. The effect of lime discussed in acid conditions and some questions advanced for consideration in this connection. ✦ ✦ ✦

THE problem of disposing of spent acid is one which is solved at each mill in terms of local surroundings and local ordinances. It will scarcely be believed, but some mills have sold it F. O. B. tubs to neighboring chemical industries. Scarcely less fortunate is the wire manufacturer who is invited to discharge spent acid into city sewers to neutralize some objectionable alkaline waste from a neighboring mill, or is permitted to let it pass, at specified intervals and concentrations, because of its beneficial effect on some local sewage disposal system. Sometimes when a mill is near the banks of a stream where the fish are unusually rugged and the sporting population is either apathetic or willing to fish upstream, it is possible to simply pull the plug and let nature take its course.

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THE recovery of ferrous sulphate is usually undertaken not for profit but to comply with local ordinances. The spent liquor is neutralized with wire scrap and sulphate is crystallized either naturally or under a vacuum system. In some instances, particularly in European mills, a closed system is set up. Acid is used at about 15%, iron concentration forced up to a high point, and sulphate crystallized by simple cooling. The mother liquor is made up to strength with fresh acid and pumped back to the cleaning vats, in which the time cycle is maintained by controlling pickling temperature through a rather wide range.

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IN some localities dumping into streams or city sewers is permitted only with the understanding that the liquor shall be neutralized. Lime is almost always used for this purpose as it is cheap and plentiful around a wire mill. From the chemical standpoint lime is a rather poor neutralizer for sulphuric acid. The lime is in suspension, the reaction rather slow, and the product, calcium sulphate, is nearly insoluble. It is white, like lime itself, and there is no easy way to follow the reaction and to determine, without chemical tests, whether things are going as planned. If dry lime, or lime putty, is mixed with acid, calcium sulphate forms and coats the outside of the lumps, after which there is no further action and most of the lime remains entirely inert.

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COMMON practice in neutralizing is to provide a sump in the cleaning-house cellar, which is kept supplied with lime, including air-slaked powder and floor sweepings, and through which the spent acid is allowed to flow on its way to the sewer. As a friendly gesture toward compliance, this is doubtless adequate. As a matter of fact, spent acid is commonly dumped at such a low acidity and accompanied always with such a large volume of water that chemical treatment is only a formality.

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I WAS recently faced with the problem of bringing a rather strong wire mill waste to a very definite low acidity under orders that left no loop-holes. Local conditions made it impossible to get in any sort of settling basin between tubs and sewer. It was clearly necessary to treat the acid in the cleaning tubs before dumping it, and with inspectors lurking about on the river bank to check acidity, no friendly gesture would suffice. If the solution were thrown slightly onto the alkaline side, there would be a precipitation of ferric hydrate which, mingled with calcium sulphates would form a gelatinous mass decidedly reluctant to flow briskly through small pipes and valves. Here was an operation which must be handled with precision.

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WIRE drawing lime is a very pure and by no means a cheap material. In the district involved, pulverized limestone at 200 mesh could be had at less than half the price of good burnt lime. In spite of its greater weight per effective basic unit, it was clearly the cheaper reagent, and I found that the effervescence due to the escape of carbonic acid kept the bath well stirred, speeded up the action, and prevented the coating of particles by sulphate. The resulting suspended mass, if kept just on the acid side of neutrality, flowed well through pipes and valves.

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I CARRIED through a series of laboratory experiments with spent liquors of various compositions, with temperatures and other conditions varied, checked the neutralizing value of the carbonate against its theoretical value, and determined the conditions under which neutralization could be most efficiently done. Arriving at the mill prepared to introduce the system, I found that the boys on the job, displaying that rugged individualism and inititative that is at once the hope of American in-

dustry and the despair of economic planners, had worked out their own system by trial and error, and were, so they said, neutralizing the tubs with a thin paste of wire drawing lime.

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ARMED with quotations on lime and powdered limestone, together with their relative values in Ca0, I set out to prove to them that limestone would do the job cheaper, upon which they proved from their records that their actual costs were lower than mine! A little calculation brought out the fact that they were neutralizing acid, or thought they were, with a little less than half the alkali that would theoretically be required. There was no doubt about this, since the laws of chemistry require a definite proportion between bases and acids to form neutral salts.

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I EXPLAINED the situation to them very patiently, and with the utmost tact and diplomacy suggested that they were not neutralizing the bath, but that the presence of large quantities of lime was perhaps obscuring the end-point or affecting the color of the indicator. They invited me to test the neutral bath myself, and I found that it was in fact neutral by all tests. I checked the amount of lime they were using and found it as recorded. I suggested that their titrating solution was off standard, and that a bath which they believed to run 3% acid was actually only 1½%. I checked their standard solutions both by calculation and against a solution of my own mixing, and it was absolutely correct. As a last desperate measure, I checked the volume of the pickling vats and found again that they were right. They were actually neutralizing a certain weight of free sulphuric acid with less than half the lime which chemical laws declared to be absolutely required. I retired in disorder.

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THERE is nothing more irritating than a mystery of this sort. I checked over the facts and figures with several good chemists whose chemistry was of a later date than mine, confident that somewhere I had forgotten to multiply or divide something by two, but the chemists found my figures accurate and could suggest no solution to the problem, so I settled down to think it out. I arrived at a tentative solution, which the chemists believe is close to the truth.

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IN waste liquor we have, in addition to a small amount of free acid, a large amount of ferrous sulphate. The salts of iron, as many readers will recall, form two series, in which the value of iron as compared to the acid radical varies in the ratio of 2 to 3. Ferrous sulphate, for example, has the formula $Fe\ SO_4$, while ferric sulphate is $Fe_2\ (SO_4)_3$. Obviously iron in the ferric state combines with 50% more acid than when in the ferrous state. Some ferrous salts pass over easily into ferric salts by oxidation on exposure to the air. Ferrous sulphate, however, is very stable.

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HERE is what may happen. The addition of lime causes a local precipitation of ferrous hydroxide. This is a white salt which oxidizes to the familiar red-brown ferric hydroxide so quickly that the human eye has never seen the white ferrous hydroxide except when it has formed in a vacuum. This brown ferric hydroxide immediately dissolves in the free acid to form ferric sulphate. Somewhere in the series of reactions and equilibria taking place in the bath, there is an influence which causes a part of the ferrous sulphate to oxidize to ferric sulphate, thereby taking up 50% more sulphuric acid. As the spent acid always carries much more iron than is necessary to absorb its free acid if this reaction can be started, it is not surprising that a relatively small amount of lime will result in neutrality.

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IN fact since the lime may be regarded rather loosely as a catalytic agent, it is pertinent to inquire why we need even as much as half the theoretical amount. Doubtless a certain mass is needed to keep equilibria moving in the desired direction, but is it not possible, since we have enough iron in the bath to do our job, that under proper conditions we could touch off this oxidation process with a smaller volume of lime, or possibly with a still smaller bulk of some more powerful oxidizer or catalyst?

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I SHOULD like to toss this problem into the laps of those of our Wire Association members whose minds are of the right quality to grapple with the problems of physical chemistry, and also to suggest that here is a neat little practical research all lined up for some student chemist. While we are waiting for the ideal catalyst, we must go on with lime. It is always possible to add lime and test, but it is considerably more efficient to test and then add lime and dump. Doubtless the amount of lime required will vary with acidity, iron content, temperature, time, and possibly other factors, and will vary in curves far from simple. The presence of organic inhibitors may affect the curves.

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Industrial Diamonds

By Morris Simons, President,
Union Wire Die Corp., New York, N. Y.

An interesting description of the classifications, sources of supply, grades, and uses of industrial diamonds together with an outline of the price outlook and a forecast of technical improvements in diamond dies.

IT has been my fortune, good or otherwise, to have had pass through my hands and caused to be manufactured into tools and dies probably more industrial diamonds than any man in this country. In the course of the many years that this has been going on, I have quite naturally gathered a good working knowledge of the subject. Without wishing to appear as an authority, I will recount for you such data as I have, which may confirm your own, or if you have no previous knowledge, may prove to be informative and interesting.

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Classifications

DIAMONDS divide easily into two main classifications, namely, Brilliants and Industrials. As the names imply, diamonds which will make good jewels are those termed Brilliants, while all others fall quite naturally into the group known as Industrials.

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Sources of Supply

DIAMONDS come from various places, on or beneath the earth's surface. Those located on or near the surface and bearing evidences of erosion which would seem to indicate that a river, or glacier had at some time played a part in their location are termed Alluvial. Those which have to be mined, and are found deep below the surface are termed "Mined."

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TO the experienced, the alluvial diamond is quite different from the mined diamond. Visually however, the difference most apparent to the layman, is that the alluvial diamond tends to be worn smooth, while the mined diamond is in a more nearly natural crystal formation. Certain exceptions occur which do not make this rule all embracing, notably in the diamonds of Brazil which while Alluvial are recognized primarily by their odd shapes and brilliant variegated colors.

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SOME parts of the areas producing diamonds are well supplied with stones of each classification. As a rule however, the area noted for Alluvials cannot boast of any diamond mines, while the areas in which mines abound rarely produce alluvial stones. For example: the areas in South Africa from which diamonds are mined are in, or near, the source mines of Kimberly, Jaeger and Premier, while the Congo and Tanganyika provinces are most noted for their alluvial diamonds. It is interesting to note that Brazil produces alluvial diamonds exclusively.

✦ ✦ ✦

MORRIS SIMONS
President
Union Wire Die Corp.
Member of The Wire Association.

QUITE apart from the fact that diamonds are generally classified as Mined and Alluvial, is the practice of naming the diamonds as Jaegers, Premiers, Kimberly's, Congos and so on to further designate the specific type prevalent in certain areas. To the uninitiated, a diamond has always been just a diamond. But, we have seen that a diamond is either a Brilliant, or an Industrial, a Mined or an Alluvial, a Premier, a Jaeger, a Congo, a Brazil or some other identifying name, one which designates its source. This practice has sound basis in reason. The diamonds mined from different sources show wide variations in character. In notes as brief as these, it is sufficient to say that variation exists, for to attempt to point out the specific variables would tend only to confuse.

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Grades of Industrial Diamonds

THE fact that there is a wide variation in characteristics, means that some diamonds are better suited to one industrial purpose, while for another purpose those same diamonds may be of relatively little value. Thus it is that Jaegers have always been sought by the best diamond die manufacturers with Premiers as the best second choice. There are several grades of diamonds which are constitutionally unfitted to make good diamond dies. When for reasons best known to himself the diamond die manufacturer employs a diamond of poorer quality than the Premier or its equivalent, the buyer gets a tool of uncertain value. As in all things, there are good diamond dies, and others purporting to be the same thing that are not as good.

Supply Available

FOR many months we have been hearing the phrases "Economy of Scarcity" and "Economy of Abundance". Both of these terms when translated mean the same thing, "Price". The heart of diamond economy is "Scarcity". Let no one infer from this statement that diamonds are so scarce that the sources are drying up and as a consequence diamonds will soon be no longer available. As a matter of fact they are apt to be more available over a longer period because they are now scarce. That sounds anachronistic, but it is a fact and as we go on we shall see why this is true.

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THE diamond is a natural product made during the period when the world was in its earliest stages of cooling and hardening. All the natural diamonds that we will ever know of, were produced ages ago. The natural supply therefore is a fixed amount. As much of the diamond supply is either unknown or inaccessible, only those areas which are amenable to the working of man can be considered as sources of supply. Of the known sources, only those which can be profitably worked concern the ultimate cost factor.

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SO far we have a usual condition, that of a raw material being mined or produced, ready to be shipped to a market which has need for it. Prices should now reflect the laws of supply and demand. However, here the ordinary flow of goods to a market is restricted. A dam has been erected at this point which prevents the diamonds from freely seeking their natural economic place. This great barrier is that of the "Diamond Syndicate", in other words the monopoly, state and private which controls almost all the world's supply, production and distribution of diamonds. There are many who believe that this control of a natural product is despotic and unwarranted, while others say it is very wholesome. Those who favor the monopoly say that we dam other natural resources to conserve them and that if there were no Syndicate, the supply would be dissipated unwarrantedly and in a short time the world would be without this remarkable natural product. Irrespective of what the reasons are, the fact remains that the Syndicate controls the sources of production and distribution. We therefore have a controlled supply which produces a scarcity in all essential respects, at least in so far as the consumer is concerned. Scarcity always makes good talk, and if your need is great enough, and you have the wherewithal, you will pay. That appears to be the theory on which this great combine operates. It has been in business many years and continues to function as one of the world's most substantial institutions.

✦ ✦ ✦

Production Figures

A FEW words on diamond production, the record of new fields, the world consumption of diamonds and other pertinent facts will enable you to draw your own conclusions as to how the Syndicate works, and how it affects the average user.

Output of Diamonds
Union of South Africa

	Metric Carats
1929	3,661,212
1930	3,163,591
1931	2,119,156
1932	789,382
1933	512,698
1934	440,313

IF the mines had been worked to the fullest extent one might conclude from these figures that the sources were rapidly being worked out. The facts behind these figures enable you to draw a different conclusion.

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New Fields

NEW fields of diamond producing soil and mines are located by prospectors from time to time. A most noteworthy new area was discovered recently in Namaqualand (South West Africa). Production so far shows it to be a fabulously rich deposit. After two years of operation the government took over control and curtailed production in 1929. Several areas known to have valuable deposits are not worked at all, but are kept as reserves by the governments and the Diamond Syndicate.

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Price Control

EVEN though production control has always been carefully exercised, an enormous unconsumed surplus found its way into the vaults of the Diamond Syndicate in London and the Holding Companies of South Africa. As far back as 1925, the possibility of a glut became apparent. The obvious thing to do under the circumstances, unless one wished prices to break and the lowered prices wreck values all over the world and perhaps the industry itself was to curtail production. That is just what happened. One by one mines were closed and alluvial operations discontinued. The illusion of relative scarcity was successfully maintained. In view of the fact that industrial activity was slowing up throughout the world the procedure was probably very wise.

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AT this point it is well to keep in mind the fact that diamond mines and deposits are worked primarily for brilliants. The industrial diamond helps only to lower the overall cost of the diamond production. If Brilliants could not be profitably disposed of, it is conceivable that the mines would remain unworked, because the cost of Industrials would be so high as to be uneconomical.

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THE estimated yearly average world consumption of diamonds is put at or near 4,000,000 metric carats. While temporarily during the depression that average was cut down, it has quite generally been estimated for that period 2,500,000 metric carats were consumed yearly. It will be seen therefore that whatever surpluses had been accumulated, have been steadily eaten into because consumption has been in excess of production and that shortly the mines and deposits will have to be reworked. There is in fact no real shortage, but only a controlled shortage. However now that surpluses are being more quickly consumed than was anticipated five

years ago, and no large new stocks have begun to flow to the Syndicate, the supply of quality goods is rapidly being depleted. Many dealers of reputation have no diamonds capable of being made into diamond dies of quality. I have spent whole days looking over stocks of diamonds without making even a single selection.

✦ ✦ ✦

Selection of Stones For Diamond Dies

IN diamond die purchase as in other things, the man who is a large user and who has the capital to lay in supplies of the article he uses in manufacture, has some advantage over the fellow who has to buy from hand to mouth. We have found it necessary to purchase as many as fifty thousand carats of diamonds at one time, a complete series as it is called in the trade, in order to select without paying exorbitant prices, those stones which come up to our standards for diamond dies. The balance which has failed to meet our tests may be for other purposes highly desirable stones and as a rule are, and have to be disposed of. These find their way to tool manufacturers and other commercial uses.

✦ ✦ ✦

WE have agents in Europe and elsewhere constantly on the lookout for the class of quality goods which we require. Even with our resources and connections the supply of quality stones for diamond dies is rapidly shrinking, with a consequent rise in price of whatever quality goods remain. Our foresight in anticipating this condition has enabled us to carry on unimpaired. As the supply of stones which we will accept becomes more restricted we have to search more and pay more. We have been quietly accumulating stones for the last four years well aware that the restricted mine output and the Syndicate operations would some day produce just such a condition as now confronts the diamond die maker. For those die manufacturers who have not had the foresight nor the resources, the fight to maintain their die stone quality must be well nigh back-breaking. Thus it is that quality diamond dies as well as all quality diamonds for industrial and ornamental purposes continue to enjoy relatively steady prices in a period of depreciating values.

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The Price Outlook

WITH the diamond supply as it is, quality diamond die prices cannot but hold firm or go up. This may force some unprepared manufacturers to cut the quality of the stones they use. Any weakening therefore of diamond die prices at this time should in my estimation be taken to mean that a lower grade of stone is being employed, with consequent dissatisfaction to the user.

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AS the accumulated stocks of the Syndicate continue to be depleted, without being substantially augmented by new supplies, two very significant conditions begin to make themselves felt, they are: first the scarcity of quality diamonds available for all purposes and second the tendency for all diamond prices to seek higher levels. These important movements have naturally affected the wire industry. If the diamond die manufacturer is forced to pay more for his diamonds, that increase must in turn be passed on to the die consumer. If the diamond die manufacturer either cannot or will not pay the increased prices for quality diamonds he replenishes his diamond supply with stones of less quality. In either case the wire manufacturer must pay for the scarcity condition created for dies of quality. He pays the same or more for quality or the same or less for dies which produce less wire per size than he is accustomed to receive. It is the same old story of "Value for value received."

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Technical Improvements in Diamond Dies

THE last four years have seen technical improvement in all lines of endeavor. The diamond die die industry no less than others has met the increasing demands for more and more production primarily by bettering the workmanship of its product. Since diamonds are natural products, their inherent virtues are fixed at the time they are found. Two diamonds of exactly the same natural characteristics can be worked so that one will perform only a moderate amount of work, while the other will seem to perform wonders by comparison. This is brought about by the application of man's technical skill to his job. It is the same in all industries. At times in order to maintain standard prices there is a great tendency on the part of manufacturers to cut the quality of the inherent natural virtues of the materials they use and to make up for this by increased mechanical skill. As a rule such corner cutting tactics tend to defeat themselves, because when once quality has been tampered with, there is no limit to the practice. The history of the diamond die industry is marked with the wrecks of die concerns which began in good faith to do this very thing.

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IT is difficult to encompass in so small a space all the facts of value and interest in the subject of the Industrial Diamond. I have not presumed to do so. I have tried rather to sketch briefly for you some of the outstanding elements of interest which have a bearing on the wire industry.

Make Your Plans Now To Attend
THE ANNUAL WIRE ASSOCIATION MEETING AND CONVENTION
To Be Held In Association With The
NATIONAL METAL CONGRESS
At CLEVELAND, O. OCTOBER 19th to 23rd, 1936

Heat Treating Steel Wire Rods In Coils For Bolt Stock

By J. M. Brown,
Sales Engineer, Surface Combustion Corp., Toledo, Ohio.

A description of a furnace installation especially designed to meet the requirements of the customer for heat treating steel wire rods in coils for bolt stock. Work produced by the installation is meeting all requirements for structure and uniformity in quality. ✦ ✦

STARTING with the proposition that they wanted the proper type of furnace to produce a structure equal to or better than that secured by previous heat treating methods, officials of a large bolt manufacturing company had photomicrographs made of samples taken from stock to determine the percentage of spheroidization, and made a complete and careful study of heat treating furnaces and their own needs which resulted in the recent installation of a gas-fired bell type annealing cover, with Radiant Heating Elements in their plant.

✦ ✦ ✦

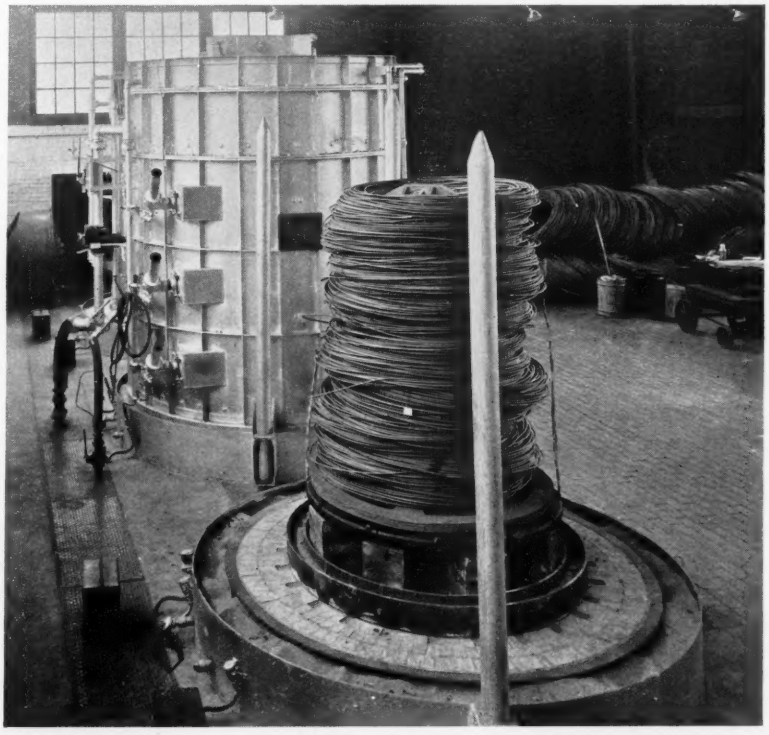
THIS manufacturer produces bolts from steel wire rod by cold heading. The wire rod used is No. 1035 steel, varying in diameter from a minimum of 17/64 inches to a maximum of 7/8 inches. The sizes most frequently used are 13/32, 31/64 and 37/64 inches.

✦ ✦ ✦

THE wire rod is received from the mill in coils, usually weighing 730 lbs. each, regardless of rod thickness. These coils have an inside diameter of approximately 26 inches, an outside diameter of approximately 44 to 54 inches and are approximately eight inches high. Heat treating is necessary to assure constant and uniform quality of structure.

✦ ✦ ✦

THE furnace installed was especially designed by the manufacturer to meet the requirements of the customer. The installation includes a gas-fired bell type annealing furnace or cover, three bases, a special cooling cover, and two inner covers, together with heat control valves, and temperature control instruments.



Installation for heat treating wire rods for bolt stock. ✦ ✦ ✦ ✦ ✦

THE heating operation is rather simple. The coils of wire rod are stacked on a spindle on the alloy base plate to a maximum height of 64 inches above the plate. Eight coils, weighing 730 lbs. each or a total of 5830 lbs., constitute a charge. Over this charge is placed or lowered an inner cover, then the annealing cover is lowered into position, the cover resting in an alloy sand seal trough, completely sealing the furnace.

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THE charge is then heated to temperature and soaked for a half hour. The annealing cover is then removed by an overhead crane, and the special cooling cover lined with high temperature insulating block, which is designed to control the cooling down to 1000° F., is lowered in place, the bottom of which also engages in an alloy sand seal.

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DURING the heating interval a second base has been charged and, as soon as the annealing cover has been lifted from the first charge, it is lowered over the next. While the first charge is cooling and the second is being brought to temperature, the third base is being loaded ready for heating. Later, as the third charge is

(*Please turn to page 354*)

Exports and Imports of Wire

Exports of Iron and Steel Wire Products in April, 1936 and April, 1935
(In gross tons)

	April 1936	March 1936	April 1935
Wire rods	4,664	4,042	1,330
Plain, black or galvanized iron or steel wire	3,288	3,547	1,678
Barbed wire and woven wire fencing	3,204	2,861	3,085
Woven wire screen cloth	100	85	41
Wire rope	370	208	424
Insulated iron or steel wire and cable—see analysis below			
Other wire and manufactures	367	409	498
Wire nails	850	569	938
Tacks	24	31	26
Other nails, including staples	288	162	194
Bolts, machine screws, nuts, rivets and washers	561	540	568
Total, these 10 classifications	13,696	12,454	8,782

Imports of Iron and Steel Wire Into the United States
(In gross tons)

Concrete reinforcement bars	202	86	117
Hollow bars and drill steel	185	134	158
Wire rods	1,597	1,039	1,094
Barbed wire	1,439	2,032	1,813
Round iron and steel wire	233	331	339
Telephone and telegraph wire	5	26	3
Flat wire and strip steel	259	218	205
Wire rope and strand	257	268	189
Other wire	138	143	57
Hoops and bands	2,710	1,765	1,491
Nails, tacks and staples	2,337	2,604	2,211
Bolts, nuts and rivets	36	15	19
Total, these 12 classifications	9,398	8,661	7,696

Exports of Insulated Wire and Cable, April, 1936

	Foreign		To U. S. Possessions	
	Pounds	Dollars	Pounds	Dollars
Insulated iron or steel wire and cable	3,630	$ 722	299	$ 74
Rubber-covered wire	518,486	106,261	57,233	11,155
Copper weatherproof wire	31,881	6,314	4,044	1,051
Copper telephone cable	26,193	4,442	322	130
Other insulated copper wire	300,187	64,984	92,724	17,457
Nickel-chrome electric resistance wire	12,330	16,190	13	15
Total, these 6 classifications	892,707	$198,913	154,635	$29,882

Exports

INCREASED exports of tin plate and taggers' tin (39,618 tons), heavy rails (10,972 tons), black steel sheets (10,614 tons), tanks, not lined (7,546 tons), wire rods (6,787 tons), plain shapes (6,654 tons), and skelp (3,645 tons) were the highlights of the trade during the first four months of this year. With respect to foreign outlets, healthy gains were noted in the trade with Canada, Brazil, Turkey, China, Uruguay, Mozambique, Australia, British Malaya, and the Union of South Africa.

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TRADE in scrap (iron and steel, tin plate, and waste — waste tin plate) also expanded in April when the total reached 196,906 tons, exceeding the March total (by 17.4 percent) and that of the corresponding month of 1935 by 44 percent). Shipments during the first four months of 1936 at 668,323 tons have been somewhat below (6.6 percent) the level maintained in the corresponding third of the previous year.

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Tin Plate Continues to be Leading Export Item in April

TIN plate — as in previous months — was the chief iron and steel product shipped during April (from the standpoint of tonnage), the total of 24,886 tons finding numerous outlets among which the outstanding were China (2,818), Canada (1,970), Uruguay (1,899), Brazil (1,746), and Argentina (1,539). Black steel sheets (12,250 tons) followed and in its widespread trade went principally to Canada (5,149), Soviet Russia (1,843), Australia (1,106), Mexico (1,098), and China (824). Next came 'other plate' (6,390 tons) which was purchased chiefly by Mozambique (2,429), Canada (1,200), the Union of South Africa (1,057), the Philippine Islands (376), and Japan (319). Galvanized steel sheets (5,464 tons) went mostly to the Philippine Islands (2,346), Brazil (587), Mexico (361), Canada (313), Colombia (296), and Australia (270), and the bulk of the trade in plain shapes (5,282 tons) was with Canada (3,010), the Philippine Islands (535), Cuba (498), Venezuela (392), and Peru (235). Heavy rails (4,882 tons) was the sixth product of importance and was purchased mainly by Brazil (2,992), China (1,005), and Canada (709).

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Exports of Iron and Steel Scrap at Higher Level in April

SHIPMENTS of iron and steel scrap (190,845 tons) registered increases of 16.8 percent and 45 percent, respectively, over those which went forward in March and in the corresponding period of 1935. Exports of tin plate scrap (2,507 tons), however, were slightly under (37 tons and 421 tons respectively) the totals for the indicated periods, while those of waste —waste tin plate (3,554 tons) gained 120 percent and 64 percent respectively.

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Canada Remains Leading Individual Market in April

APRIL shipments of iron and steel products to Canada (excluding scrap) amounted to 24,681 tons, and outstanding in this trade were black steel sheets (5,149), skelp (3,832), plain shapes (3,010), cold rolled strip steel (2,270), 'other steel bars' (2,087), and tin plate (1,970). Sales to Brazil followed an upward trend, the aggregate of 8,073 tons being chiefly of heavy rails (2,992), tin plate (1,746), barbed wire (794), and tanks, except lined (519). Japan followed with purchases involving 6,317 tons, the bulk of which being made

(Please turn to page 346)

'Round the World With the Wire Industry

Recent Agreement Between International Steel Cartel and South Africa

COMMENT was made in a recent issue regarding the agreement between the Continental Steel Cartel (including the British Federation) and iron and steel interests in the Union of South Africa. A statement was recently issued in London (in behalf of the Chairman of the South African Iron and Steel Industrial Corporation) denying that steel prices in the Union would be materially increased as a result thereof. It was stated that "the agreement contains a clause which lays down a maximum scale of prices beyond which neither the South African producers nor exporters, parties to the agreement, are allowed to go in arranging prices. This maximum scale of prices is based on the British home consumption price, which was unanimously adopted by all parties as being neither the highest nor the lowest of the European home consumption prices. The low prices that have recently obtained in South Africa were due entirely to dumping. It must again be stressed that the South African steel industry is not asking for any ordinary Customs protection."

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Increased Brazilian Imports of Staples, Screws and Rivets in 1935

LAST year, **Brazilian** imports of the above-named items (valued at some $302,000) registered a substantial increase in value over the total received in 1934 (to a value of $185,000). In order named, the outstanding suppliers were Germany, the United States, Belgium, and the United Kingdom. There is local manufacture of black rivets, but those coated are imported. Both wood and machine screws are produced locally, activity with respect to the last-named item having only just commenced. A good share of the business in "very small wood screws" is obtained by suppliers in the United States.

Uncertainty in Birmingham Industry

EXPECTATION of price re-adjustments (on the grounds of increased production costs) overshadow trade activity in most branches of the Birmingham **(England)** iron and steel industry. Marked coke shortage has adversely affected local pig iron producers, and in some cases a number of firms have been forced to utilize "slack-blast", and output is limited chiefly to the fulfillment of existing contracts. The local tube industry reports a steady expansion of demand—particularly for stainless steel products.

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Tata Output Continues at High Level in March

OUTPUTS of pig iron (79,640 tons), steel ingots (72,760 tons), and rolling mill products (52,500 tons) during March registered increases when compared with corresponding month of

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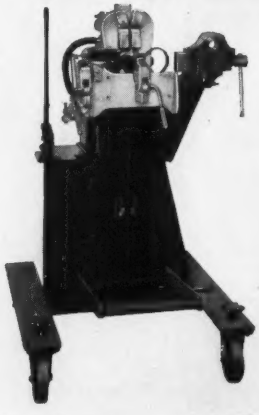

MICRO PRODUCTS COMPANY
20 NORTH WACKER DRIVE, CHICAGO, ILL.
Telephone State 7468 General Office and Factory, Peoria, Ills.

'Round the World With the Wire Industry

1935. The output of the Mysore Iron Works, Bhadravati, during that month totaled 1,836 tons of charcoal pig iron (1,928 tons in March 1935), while the total production of the Indian Iron and Steel Co., Ltd., during the first quarter at 119,480 tons was considerably in excess of the 67,167 tons produced during the comparable period of 1935. The Bengal Iron Company (at its Kulti Iron Works) produced pig iron to the extent of 15,265 tons and 13,639 tons, respectively, during January and February of the current year.

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Belgian Export Licenses for Steel

DECISION has been reached in **Belgium** to subject certain products of the iron and steel industry to export licenses. It was said that no question of quotas or prices is involved and the licenses will be granted upon evidence that the products are for export. Producers have, therefore, agreed not to increase prices.

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Only 34% of World Steel Output Made in U. S. A. in Past 5 Years

STEEL production in the United States during the past five years has averaged only 34 per cent of the world steel production, the American Iron and Steel Institute has estimated. Not since the five year period ending 1897 has the steel industry in this country produced as small a proportion of total world output.

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BETWEEN 1931 and 1935 a total of 122,600,000 tons of steel were produced in the United States, while 238,000,000 tons were produced in the other steel-making countries of the world. In the preceding five-year period steel production in this country aggregated 43 per cent of the world output, 242,000,000 tons being produced here as against 270,000,000 tons elsewhere in the world.

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FROM 1865, when only 3½ per cent of the total steel produced in the world was made in this country, to 1919 when 60 per cent was produced here, both the relative and actual importance of the United States as a steel producing nation showed a general upward trend.

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SINCE 1919 the trend of relative output has been generally downward, and even in 1929, the all-time peak of steel production in this country, only 48 per cent of the world's output was made in the United States.

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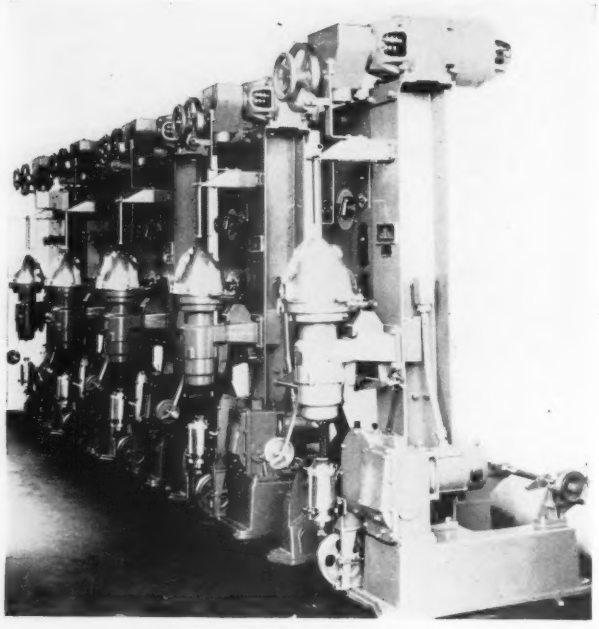
IN 1932 the tonnage of steel produced in this country amounted to only 28 per cent of world production, the lowest proportion of total world output since 1888. In spite of the fact that steel production in the United States in 1935 was nearly 2½ times as large as production in 1932, only 35 per cent of world steel was made in this country.



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'Round the World With the Wire Industry

PRODUCTION of 34,000,000 tons of steel in this country last year was more than twice the output in Germany, which produced more than 16,000,000 tons to hold second place among steel making countries. World production in 1935 is estimated at 76,000,000 tons.

✦ ✦ ✦

THE Beeman Combustion Supply Co., 2970 West Grand Blvd., Detroit, Mich., will serve in their territory as engineering sales representatives of the Industrial Furnace Division of The Philadelphia Drying Machinery Co., Philadelphia, Pa., manufacturers of Furnaces, Ovens, Dryers and Industrial Burners. The Beeman Combustion Supply Company invites inquiries and offers their extensive experience in industrial heating, without placing the recipient under any obligation whatever.

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German Notes

THE German wire rod cartel reports that business on the domestic market continues rather satisfactory, and there is every outlook that this business will be maintained during the coming weeks. On the export market, business has also improved, but only because price reductions have been granted. Prices for China, Japan, the United States and Spain have been quoted slightly below the official quotation of £ (gold) 4.10, whereas quotations to all other markets are unaltered.

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THE wire export business, which had been satisfactory during April, has declined recently; orders booked are smaller, and the general tendency is weak. However, the German industry feels it less than the others since the compensation agreements with approximately thirty-five countries secure a steady influx of business. The quotations are unaltered, except for China, where prices have recently been slightly reduced. The demand for wire products from the United States has also declined except for manufacturers' wire which remains fairly steady. More wire rods have been recently purchased from the United States.

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THE Norwegian wire industry is now negotiating for entrance into the IWECO. The Norwegian industry is the principal source of supply for ship nails and similar steel nails, and with the Swedish industry controls the principal export markets. The competition in these products has recently been augmented by the advent of Yugoslavian nails on the markets.

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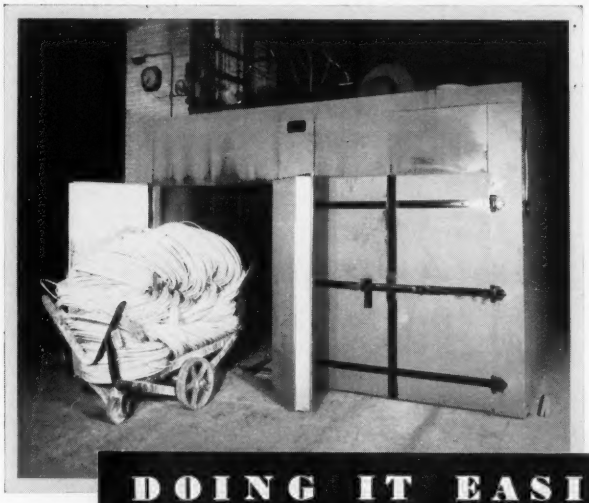
REPORTS from the Far East say that the Japanese Government commission, which controls the quality of the export products,



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'Round the World With the Wire Industry

has recently been reorganized and is exercising a far closer control than previously, with the result that many export products in the port warehouses were returned. This action is combined with recent statements of the Ministry of Industry and Commerce, that the time of price dumping is past. This, of course, caused prices to rise, and the export business, therefore, has grown more difficult for the Japanese industry. Of course it cannot be determined whether this condition will be permanent or whether the market can actually count on higher Japanese prices.

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NOW that Ethiopia has been "swallowed" by Italy, the German industry is particularly interested in the possibilities which are offered by the Ethiopian market. Germany, as a non-sanctionist country and by maintaining good relations with the Italian industry, has sent representatives to Ethiopia as very large orders can be expected for telegraph and telephone wires, cables, fencing wire, etc., which the Italian industry cannot supply in large quantities. The difficulty, of course, is how to get payment, as the Italian banks have not enough foreign cash to make transfers for such purchases. The industry is, therefore, already organizing sales of Ethiopian products, such as coffee, hides, skins, minerals, cotton, etc., in exchange for which supplies will be sent to Ethiopia. Although deliveries might not begin before September, the industry already counts on orders of various thousands of tons.

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First Greek Rolling Mill for Steel Bar and Rod Output (from Billets and Blooms) Under Way

D. & A. Stavrianos—manufacturers of wire and wire products from imported wire rods — now have under construction the first rolling mill for the production of steel bars and rods (from billets and blooms) at Piraeus, **Greece.** The firm is said to be endeavoring to secure permission to import its raw materials from the United States. The capacity of the plant under construction is placed at 50 tons per 16-hour day (or some 15,000 tons annually). Of interest to American manufacturers is the possibility that it may afford an opportunity to sell American blooms and billets in connection with the operation of the projected rolling mill.

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Australian Market for Barbed Wire

ONLY 150 gross tons of barbed wire were imported into the **Australian** market during the fiscal year 1934-1935. On the other

(*Please turn to page 351*)

OVERHEAD MATERIALS HANDLING

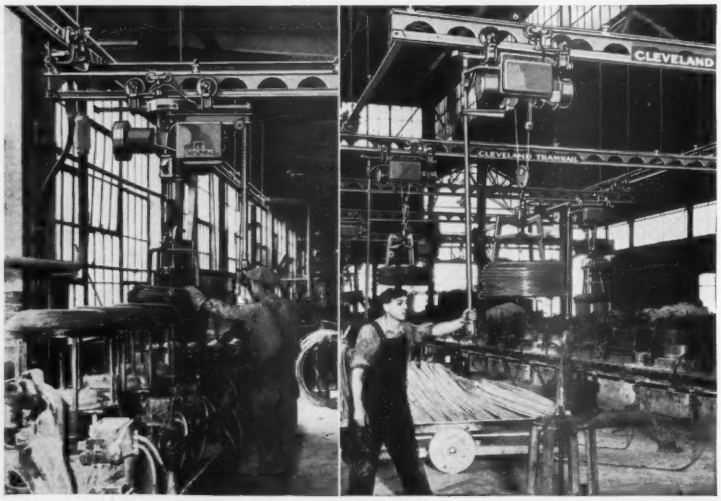

Photo 2497 Photo 2656

Turn Table Type, see Photo 2497, for use where the line of draw blocks is mounted on two sides of an aisle.

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W. N. Weaver, Manager Steel Plant, Northwestern Barb Wire Co.

W. N. Weaver, formerly superintendent of the Indiana Harbor plant of Youngstown Sheet & Tube Co., Youngstown, O., has been named manager of the steel plant of Northwestern Barb Wire Co., Sterling, Ill.

✦ ✦ ✦

J. W. Lewis Treasurer Of General Electric Company

J. W. Lewis, who since 1923 has been assistant to President Gerard Swope, was elected treasurer of the General Electric Company at the meeting of the board of directors of the company in New York City on April 24th. He succeeds R. S. Murray, who retired on May 1st because of ill health, after 43 years' service with the company.

✦ ✦ ✦

Arthur Roeder Heads New Colorado Fuel & Iron Corporation

AT meeting of new Colorado Fuel & Iron Corporation, reorganized Colorado Fuel & Iron Company, Arthur Roeder, formerly president of the old company, and receiver and Federal trustee, was elected president. W. A. Maxwell, Jr., was elected vice president; S. G. Pierson, vice president and treasurer; Newell H. Orr and Thomas Aurelius, vice presidents; D. C. McGrew, secretary; H. C. Crout, assistant treasurer; Harry P. Fish and Terrell C. Drinkwater, assistant secretaries; Fred Farrar general counsel; W. B. Montgomery, controller, and J. A. Bullington, assistant controller. Directors are Messrs. Roeder, Pierson, Maxwell, Farrar, McGrew, and John Evans, Jesse F. Welborn, Cyril J. C. Quinn, Carl J. Schmidlapp, and Bertram Cutler.

✦ ✦ ✦

THE Otis Steel Co. has opened an eastern district sales office in the Chrysler Building, New York City, E. J. Kulas, president of the company, announced today.

MR. E. A. Steif, who for many years has represented the company as manufacturers agent in the east, has been appointed manager of sales for the New York district.

✦ ✦ ✦

C. E. Sims

MR. C. E. SIMS has been appointed research metallurgist at Battelle Memorial Institute, Columbus, Ohio. Mr. Sims, who was graduated in Chemical Engineering from the University of Illinois and who received his degree in metallurgy in 1916 from the University of Utah, served for some years as metallurgist in the U. S. Bureau of Mines before going to the American Steel Foundries,

(*Please turn to page 340*)

Come to Cleveland

by rail
by motor
by steamer
by air

and come to Cleveland's most convenient hotel

HOTEL CLEVELAND

• Without going out of doors from your train in the Union Terminal a red cap will bring you to the large, friendly lobby of Hotel Cleveland.

All principal motor routes pass our door on Cleveland's Public Square. A modern 2000-car garage adjoins Hotel Cleveland and can be reached by an inside passageway.

The palatial Great Lakes steamers and cruise ships dock a few minutes away from Hotel Cleveland.

From the largest municipal airport in the world there is direct motor transportation at a small fixed charge to Hotel Cleveland.

However you choose to enter or leave Cleveland, you will find the convenient location, the hospitable welcome, the friendly attention you receive at Hotel Cleveland a pleasant memory of the city.

Rooms from $2.50 for one, $4 for two. Three restaurants and popular priced, air-conditioned Coffee Shop. Breakfasts from 25c, luncheons from 50c, and dinners from 75c.

HOTEL CLEVELAND Cleveland

Outstanding Personalities of the Wire Industry

(*Continued from page 339*)

Indiana Harbor, Indiana, in 1927 as Assistant Director of Research. Mr. Sims has written extensively on the metallurgy of iron and steel and with G. A. Lilliequist was awarded the Robert W. Hunt prize by the American Institute of Mining and Metallurgical Engineers in 1933 for the paper "Inclusions, Their Effect, Solubility and Control in Cast Steel."

✦ ✦ ✦

J. M. Sylvester, Assistant General Manager of Bethlehem Plant, Bethlehem Steel Company

J. M. Sylvester has been appointed assistant general manager of the Bethlehem plant. He was formerly in charge of the Lehigh division of this plant. Mr. Sylvester attended the U. S. Naval Academy at Annapolis and after two years in the Navy entered the employ of Bethlehem. In 1921 he became superintendent of forges and foundries, and in 1924 superintendent of the Lehigh division.

Roy G. Roshong, Metallurgist, Lindberg Steel Treating Co.

ROY G. ROSHONG is now metallurgist for the Lindberg Steel Treating Company of Chicago.

✦ ✦ ✦

MR. Roshong has been associated with Canton Steel Foundry Co., Canton Drop Forge Co., Canton Sheet Steel Co., Dayton Engineering Laboratories, Newport Rolling Mill Co., Wadsworth Watch Case Co., United Alloy Steel Co., and, most recently, the Hoover Co. He is a member of the British Institute of Metals, Electro-Chemical Society, American Institute of Chemical Engineers, and Tau Beta Pi, honorary engineering fraternity.

✦ ✦ ✦

Julian L. Schueler

JULIAN L. SCHUELER, superintendent of the Steel and Wire Division of Continental Steel Corporation, Kokomo, Indiana, sailed for England, recently, to attend the Chemical Engineering Congress, in London. While in Europe, Mr. Schueler will study steel making processes as practiced in England, Sweden and France.

✦ ✦ ✦

J. K. Beeson, Assistant General Superintendent, Pittsburgh Steel Company

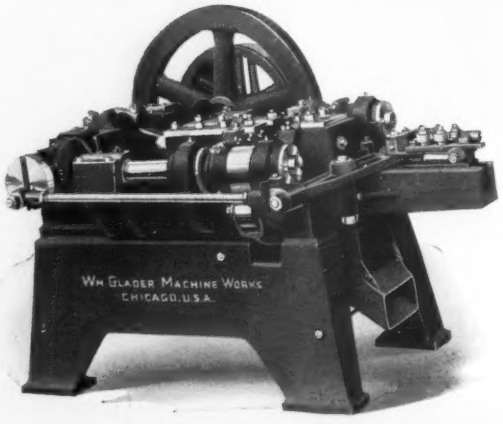
J. K. BEESON, manager of manufacturers' products sales of Pittsburgh Steel Co., Pittsburgh, has been appointed assistant general superintendent of the company. He is a son of C. E. Beeson, vice president and treasurer, and has been associated with the company since 1929.

✦ ✦ ✦

J. D. Case, Superintendent Rod and Wire Mills, Pittsburgh Steel Co.

J. D. CASE, who has been superintendent of the finishing department of the Monessen, Pa., works of the Pittsburgh Steel Co., has been made superintendent of the rod and wire mills, and will have charge of all finishing departments.

Again The Exclusive Selection



GLADER

High Speed Wire Nail Machine

Once again we are proud to announce that the Glader Nail Machine has been specified 100% in the latest, and of course, most modern nail plant in the country, now under construction in the Middle West.

Write for our catalogue and compare our guaranteed production figures with your own records.

Wm. Glader Machine Works

210 N. Racine Ave., Chicago, Illinois

New 6" and 10" Pedestal Grinders For Carbide Tools Announced By Carboloy

TWO new pedestal grinders — a 6" and a 10" grinder—designed for the grinding of cemented carbide tools, have been announced by Carboloy Company, Inc., Detroit, Michigan, manufacturers of cemented carbide tools and dies.

✦ ✦ ✦

THEY have been developed, the announcement states, to meet all requirements necessary to grind carbide tools more rapidly and without injury to the carbide tip. They are said to be suitable not only for resharpening tools dulled in ordinary use but also for the rapid reconditioning of carbide

Pedestal Grinder for Carbide Tools. ✦ ✦

tools on which the tip has been accidently broken, the reshaping of carbide tools, and the rapid grinding of milled and brazed carbide tools (milled and brazed tools are carbide tools finished except for the grinding operation).

✦ ✦ ✦

THE 6" grinder is designed for the interchangeable use of silicon carbide cup wheels (for roughing and finishing) diamond wheels, and lapping discs. It is intended for plants having carbide tools in the smaller size range (up to about 5/8" square) and a relatively few larger sizes of tools. The 6" grinder also supplements the larger 10" grinder for plants whose tools require reconditioning on diamond wheels or lapping discs. For such work all sizes of tools can be accommodated.

✦ ✦ ✦

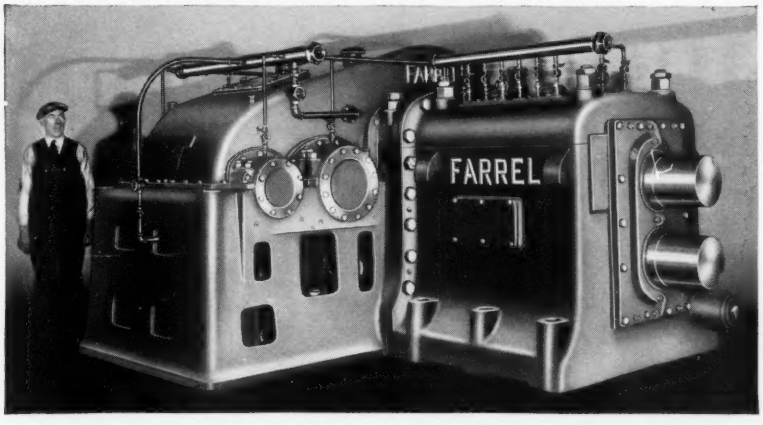
THE 10" grinder is designed for both peripheral grinding on straight wheels (silicon carbide) and face grinding on silicon carbide cup wheels. Both roughing and finishing can be done on the one machine.

✦ ✦ ✦

A FEW of the more outstanding features of these machines are described as follows:

(1) Provision for rapid wheel changes when necessary. Straight wheels are exposed for changing by simply loosening a single wing nut

(*Please turn to page 343*)



SPACE-SAVING COMPACTNESS

THE ILLUSTRATION—400 H. P. Double Reduction Drive with Integral Pinion Stand . . . Sykes continuous tooth herringbone gears and mill pinions . . . tapered roller bearings throughout, including main shaft center bearing of extra large thrust capacity . . . central lubricating system . . . built-in sprays for the gear teeth . . . flood lubricated bearings.

FARREL ROLLING MILL EQUIPMENT also includes: Rolling Mills—Chilled Iron and Special Alloy Iron or Steel Rolls —Universal Mill Spindles—Rod Mill Tables and Manipulating Equipment—Rod Coilers—Lead Presses for Pipe or Rod—Roll Grinding Machines—Roll Calipers — Gears — Mill Pinions — Drives up to 10,000 H. P.

This combined drive and pinion stand is one of four Farrel-Sykes units recently installed for a high speed, four-high continuous cold mill.

Combining the double reduction drive and pinion stand in a single unit reduces the overall length—an advantage where floor space is limited.

The design provides for rigid connection of both units to assure permanence of alignment. Sykes generated gears and mill pinions, tapered roller bearings throughout and other features of design guarantee maximum efficiency . . . smooth, quiet operation . . . long life and trouble-free service.

This unit is typical of the advanced engineering applied to Farrel Heavy Duty Rolling Mill Drives. They are designed not only to meet the requirements of modern rolling mill practice but especially to fit the particular conditions in every individual case. **They are engineered to fit the job.**

Farrel engineers are available for consultation on your drive problems. No obligation, of course.

FARREL-BIRMINGHAM
Company, Inc.

38 Main St., Ansonia, Conn — 327 Vulcan St., Buffalo, N. Y.

A Review of Recent Wire Patents

No. 2,039,368, SCREW, Patented May 5, 1936, by Fred N. Tilton, Hartford, Conn.

The inventor provides a wood screw having a body core of uniform diameter and a point core which is concave from the body core to the tip, the screw being provided with a thread that has a constant maximum diameter on the body core and continues uniform and full on the point core to the tip.

✦ ✦ ✦

No. 2,039,438, WIRE ROPE MACHINE, Patented May 5, 1936, by Archibald J. Morgan, Trenton, N. J., assignor to John A. Roebling's Sons Company, Trenton, N. J., a corporation of New Jersey.

More specifically, the inventor provides a holder for the squeezer, this holder having a network of tortuous and connected passages, surrounding the squeezer, the network being connected with a source of cooling fluid.

✦ ✦ ✦

No. 2,039,977, INSULATION, Patented May 5, 1936, by Carl F. Obermaier, York, Pa., assignor to General Electric Company, a corporation of New York.

✦ ✦ ✦

A device is provided for coating the wire conductor with an adhesive and then applying the insulation in the form of fibers, preferably in a flocculent condition and with the fibers arranged in parallelism to themselves and the conductors. Raw asbestos is suggested as a suitable insulating fiber.

✦ ✦ ✦

No. 2,040,282, COATING FERROUS METALS WITH CADMIUM, Patented May 12, 1936 by Carl E. Swartz, Highland Park, N. J., assignor to American Smelting and Refining Company, New York, N. Y., a corporation of New Jersey.

To the cadmium bath this inventor adds from approximately 0.1% to approximately 10% of nickel.

✦ ✦ ✦

No. 2,040,321, METHOD OF MAKING AND CONTROLLING A LUBRICATING COMPOUND, Patented May 12, 1936 by Raymond P. Lutz, Chicago, Ill., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

More specifically, the method is one for drawing wire and comprises compounding a soap, fat and water emulsion to produce a lubricating compound having a pH value within definite predetermined limits for drawing wire through a die lubricated by this compound. At intervals, a sample of the compound is withdrawn and water added to the sample to clarify the compound, whereupon the clarified compound is divided into two portions and an indicator added to one of these portions so as to make a color test to determine the pH content of the compound.

✦ ✦ ✦

No. 2,040,347, MEANS FOR FINISHING HELICAL FORMS, Patented May 12, 1936 by B. Wickliffe Twyman, Milwaukee, Wisconsin, assignor to Lavine Gear Company, Milwaukee, Wis., a corporation of Wisconsin.

Complete Descriptions and Drawings of Patents May Be Had for 25 cents. Address, Wire & Wire Products, 17 East 42nd St., New York.

This invention covers a thread-burnishing device for providing threads on worm screws and the like, the construction including a number of adjustably mounted balls, whereby the balls will be successively effective in burnishing and enlarging the thread of the screw blank.

✦ ✦ ✦

No. 2,040,438, ARMORED BARE GROUND WIRE, Patented May 12, 1936 by Gustave A. Johnson, Newark, N. J., assignor to Electrical Patent Holding Corporation, New York, N. Y., a corporation of New York.

About the bare electrical conducting wire is a metallic armor strip of approximately S-shaped cross section which is wrapped helically and tightly upon the wire, the strip being interlocked by the provision of outwardly projecting and inwardly projecting portions and the inwardly projecting portions also providing a bead for firmly gripping the conducting wire along a helical line.

✦ ✦ ✦

No. 2,040,553, PRODUCTION OF DRAWING-PINS, WIRE-TACKS, AND THE LIKE, Patented May 12, 1936 by Julius Hockelmann, Neheim-on-the-Ruhr, Germany, assignor to the firm Gust. Raffenbeul G. m. b. H., Schwelm, Germany.

More specifically, the machine is adapted for grinding the points on disc-headed drafting pins and the like.

✦ ✦ ✦

No. 2,040,656, SPRING CONSTRUCTION, Patented May 12, 1936 by Jacob Kirstein, Philadelphia, Pa., assignor to Bunting Glider Company, Philadelphia, Pa., a corporation of Pennsylvania.

A coil spring is provided having an anchoring extension which the inventor claims will not become unintentionally disconnected.

✦ ✦ ✦

No. 2,040,780, SPRING STRUCTURE, Patented May 12, 1936 by Clair S. Reed, Jackson, Mich., assignor to Reynolds Spring Company, Jackson, Mich., a corporation of Delaware.

In this spring structure for vehicle seats and the like, the central area of coil springs is positioned and aligned by the marginal springs and frame, yet is capable of action free from restraint due to differential compression or deflection between the central area and the marginal area of the structure.

✦ ✦ ✦

No. 2,041,093, SAFETY CONDUCTOR, Patented May 19, 1936 by Edmund O. Schweitzer, Northbrook, Ill.

The inventor provides a two wire conductor assembly in which at least one of the conductors is composed of fusible metal, the structure also including an arc-extinguishing substance, whereby in the event of a contact between the conductors and a flow of current between them, the fusible conductor will melt to cause its surface to recede to separate the conductors and the arc-extinguishing substance will quench the resulting arc. There are eighteen claims in this patent.

✦ ✦ ✦

No. 2,041,269, INSULATED ELECTRICAL CONDUCTOR, Patented May 19, 1936 by Willoughby Statham Smith, Benchams, Newton Poppleford, Henry Joseph Garnete, Lymne, Solefields, Sevenoaks and John Norman Dean, Orpington, England.

Insulation comprising gutta percha of low resin content is provided with which is intimately admixed not less than 15% of petroleum jelly, this mixture having been heat-treated to prevent sweating.

✦ ✦ ✦

No. 2,041,805, MANUFACTURE OF COAT HANGERS, Patented May 26, 1936 by William Backer, Schenectady, N. Y.

The method in this patent includes uniting the ends of a length of wire in a continuous endless loop, doubling adjoining side portions of the continuous loop together into substantially parallel relation connected by a rounded bend, twisting the base of the parallel portions and then bending the remainder of the connected parallel portions into a supporting hook composed of the parallel strands of wire connected by the rounded bend at the tip of the hook.

✦ ✦ ✦

No. 2,041,842, ELECTRIC CABLE AND METHOD OF MANUFACTURING IT, Patented May 26, 1936 by Roy F. Layton, Newark, N. J., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York.

About the wire conductor is a covering of paper ribbon applied spirally and a metallic ribbon applied spirally around the paper ribbon, then a thin metallic sheath, formed from sheet metal and having its ends joined to form a waterproof casing. About this is provided a sheet of asphalt-flooded burlap and a covering of paper ribbon.

✦ ✦ ✦

No. 2,042,128, WIREWORKING MACHINE AND METHOD, Patented May 26, 1936 by Edward H. Schane, Lakewood, Ohio, assignor to The Grief Bros. Cooperage Co., Cleveland, Ohio, a corporation of Ohio.

More specifically, this machine is stated to be adapted for forming a coat hanger from a single length of wire, the wire being fed from a reel into the machine which thereupon straightens and cuts the wire then forms the necessary loops, twists the wire ends and finally forms a hook on one end.

MAKE YOUR PLANS NOW TO COME TO THE WIRE ASSOCIATION MEETING
CLEVELAND, OHIO, OCT. 19 to 23.

New 6" and 10" Pedestal Grinders for Carbide Tools

(*Continued from page 341*)

cover; cup wheels are exposed for changing by merely sliding back the tool rest tables.

(2) Vee-belts are made accessible for quick changes or adjustments by simply removing one wheel guard and side louvre.

(3) Exhaust outlets are provided for rapid connection to blower systems. On the 10" grinder the outlet is cast integral with the pedestal; on the 6" grinder the outlet is incorporated in the dust pans beneath each wheel.

(4) Both grinders are provided with tool rest tables sufficiently large to accommodate all sizes of tools, and in each case the tables extend well beyond the face of the cup wheels and around the periphery. All tool rest tables are hardened and have graduated protractos for accurate setting of tables to 20° above or below horizontal. All tables are of ground semi-steel with ground keyways to guide protractor for tools or dressers.

(5) Both the 6" and 10" grinders have reversible motors which facilitate grinding of either left or right hand tools.

(6) Motors are mounted inside pedestals of both grinders and are insulated to eliminate vibration, and are dust protected.

(7) The 6" grinder is provided with reservoir and needle valve for lubrication of diamond wheels.

✦ ✦ ✦

Rapid Grinding Technique For Carbide Tools Demonstrated

IN connection with the introduction of these grinders a series of educational demonstrations in various cities showing an improved technique for grinding carbide tools.

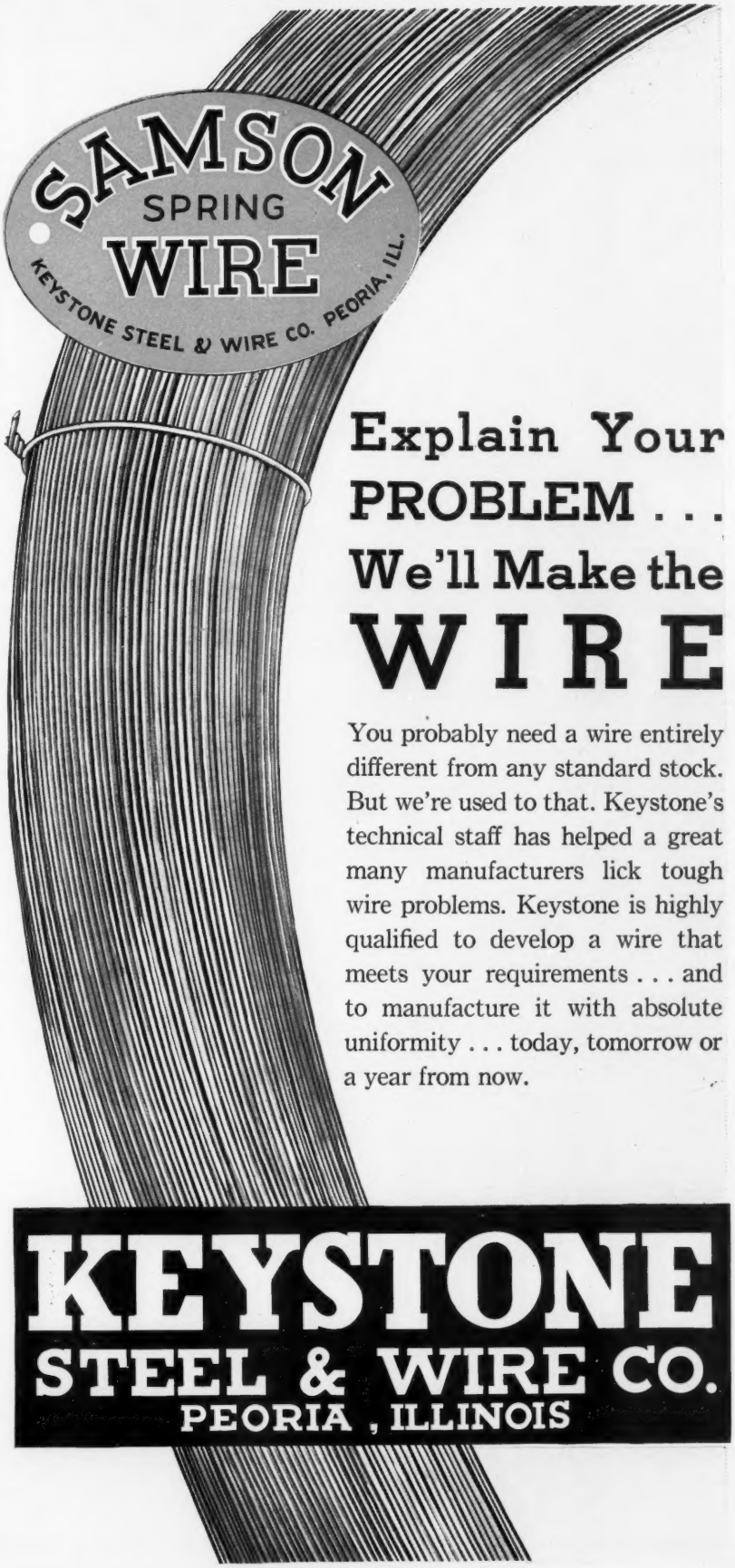
✦ ✦ ✦

THIS latest technique is of unusual interest to users of Carbide tools because of the drastic reduction in carbide tool grinding time made possible by following the recommended procedure.

✦ ✦ ✦

EXAMPLES of the remarkably short periods now required to grind various types of carbide tools are shown in the accompanying illustrations. The tool, (size ⅝" x 1¼") shown in Figure (1) is typical of one dulled through ordinary use. It requires regrinding on the front and side clearances only. The average time required to completely resharpen a tool of this type, following the latest procedure, as shown at the demonstration, is between two and three minutes. The average time using previous methods would be from 20 to 40 minutes. A "milled and brazed" carbide tool is shown in Figure (2). "Milled and brazed" carbide tools are ones released by the manufacturer directly after the carbide tip has been brazed to the steel shank. Such tools require complete grinding on all surfaces at the cutting end of the tool, and ordinarily to grind a tool ⅝" x 1¼", for ex-

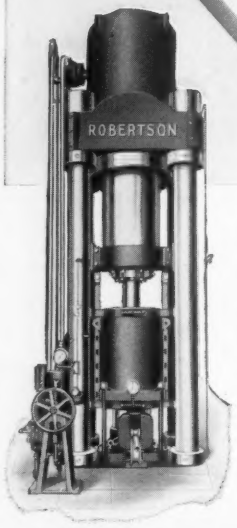
(*Please turn to page 344*)



Explain Your PROBLEM . . . We'll Make the WIRE

You probably need a wire entirely different from any standard stock. But we're used to that. Keystone's technical staff has helped a great many manufacturers lick tough wire problems. Keystone is highly qualified to develop a wire that meets your requirements . . . and to manufacture it with absolute uniformity . . . today, tomorrow or a year from now.

KEYSTONE
STEEL & WIRE CO.
PEORIA, ILLINOIS

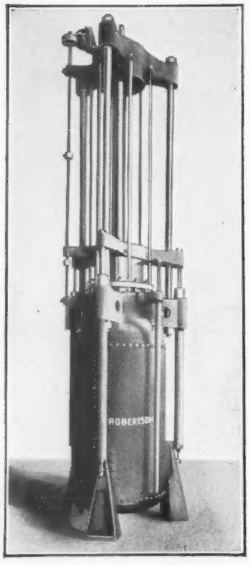


THE ROBERTSON HYDRO-PNEUMATIC ACCUMULATOR:

This modern accumulator operates on but 175 lbs. air pressure, consistently maintained in cylinder and air tank by an automatic auxiliary air compressor. And, because IT UTILIZES ITS AIR TANK AS A BASE, it can be installed easily in very little space and without a special, heavy foundation.

Safe and quick, it will pay for itself many times over, in operating economy and savings in maintenance cost.

Write for complete information.

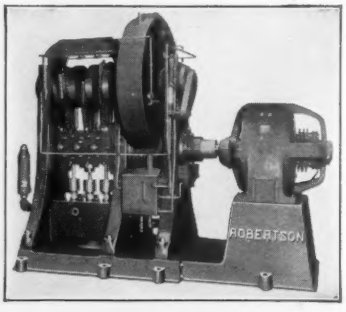


THE ROBERTSON LEAD ENCASING PRESS:

Scientifically designed and precision built, Robertson Presses assure a dependable output of uniform lead sheath . . . give satisfactory service—yet are as economical in operation as they are efficient.

They are standard equipment for many leaders in the industry, whose preference and confidence has been more than justified by their performance.

Supporting data is available upon request. Why not write today?



THE ROBERTSON HYDRAULIC PUMP:

For efficiency in operation . . . for dependability . . . for low operating and maintenance costs . . . this pump is the recognized "top" value on the market.

There are 14 separate construction features to account for its superiority . . . features fully described in literature that is yours for the asking.

Write today . . . no obligation.

John ROBERTSON CO. INC. Pioneers-Since 1858

125-137 Water Street Brooklyn, N. Y.

New 6" and 10" Pedestal Grinders for Carbide Tools

(*Continued from page 343*)

ample, would require from one to two hours. Under the new procedure, a tool this size can be completely conditioned in 4½ to 7 minutes.

✦ ✦ ✦

THIS greatly reduced grinding time is also found to be of benefit in the case of carbide tools chipped through accidental abuse. Figure (3) shows a tool of this kind (size ½" x ¾") chipped to a depth of about $\frac{3}{16}$". Frequently a tool in this condition might be considered a total loss and scrapped, due to the excessive amount of time required to recondition. Using the latest, improved technique it is stated that this tool can be completely reground in about 3 minutes.

✦ ✦ ✦

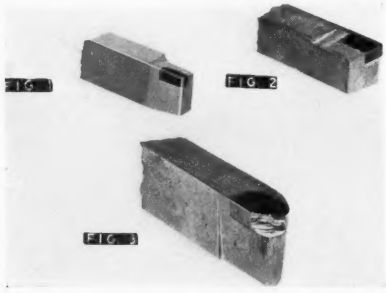


Fig. 1. Carbide tool dulled through ordinary use. Fig. 2. A "milled and brazed" carbide tool. Fig. 3. Chipped carbide tool. ✦ ✦ ✦ ✦

THE demonstrations of this latest procedure revealed several features which are important factors in making possible such drastic reductions in the time required for grinding carbide tools. These are (1) The proper dressing of grinding wheels for rapid grinding, —(2) the maintenance of constant motion of the tool while grinding, —(3) the use of double or composite angles in the tools, and (4) alternate grinding on the carbide tip and steel shank when necessary to hog off large amounts of stock, as in the case of chipped carbide tools.

✦ ✦ ✦

REGARDING the first requirements,—that of dressing the grinding wheels, the procedure fol-

lowed for the roughing and semi-finishing operations on the face of a cup wheel, or on the periphery of a straight wheel was to shape a slight crown about 1/16″ high on the wheel. The area of contact is thus held at a minimum and excessive generation of heat thus avoided. The face of a cup wheel dressed flat, as usual, was recommended for finish grinding. The second factor,—maintenance of constant tool motion, involved the steady motion of the tool across the surface of the wheel, and also the use of a rocking, or tilting, motion of the tool from side to side while roughing and semi-finishing. This avoids excessive grinding at any one spot on the tool and provides further means of avoiding excessive heat—an important factor if rapid grinding of carbides is to be successfully accomplished.

✦ ✦ ✦

THE third requirement,—the use of double, or composite clearance angles on the tool was another feature of importance brought out. When rough grinding, the use of an angle 4° greater than the finished angle desired was recommended. Finish grinding is then completed at the desired angle, grinding on the carbide tip only. By following this procedure no finish grinding on the steel shank is required, and the wheel remains open and free cutting for longer periods. This permits more rapid grinding and tends to produce a better finish.

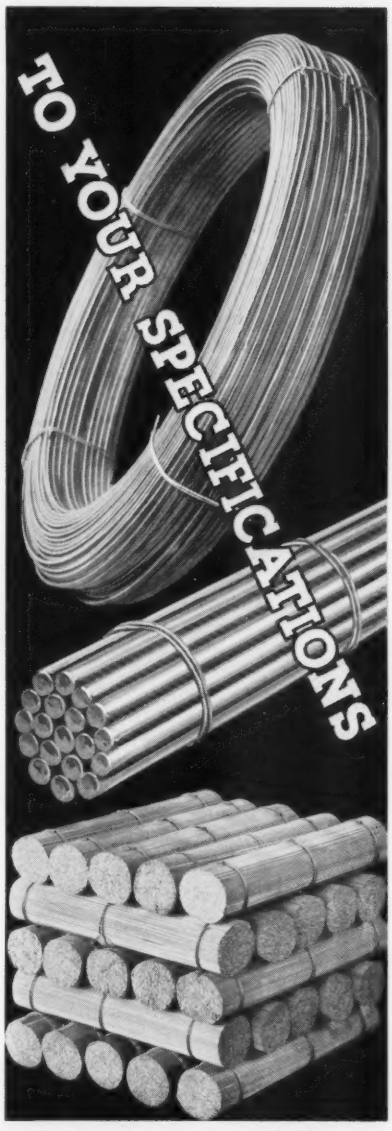
✦ ✦ ✦

THE fourth requirement, — which was demonstrated is recommended for use when it is necessary to hog off large amounts of stock rapidly. The procedure outlined involves alternate grinding first on the steel shank, then on the carbide tip, continuing in this manner until the desired amount of stock is removed. Steel naturally loads silicon carbide wheels (made specifically for grinding carbides) more rapidly than ordinary wheels, whereas carbide tips tend to dress the wheels. By alternating first on the steel shanks and then on the carbide tip, more rapid grinding is possible. Of course ordinary aluminous oxide

(*Please turn to page 348*)

MANUFACTURERS WIRE

Continental is able—and glad—to go a long way in supplying wire to your particular specifications. But we do not stop at mere meeting of formal figures. Our metallurgists will study your products and processes to help you in arriving at still better specifications, and to supply properties which may be valuable though not really written into specifications.



● ANALYSIS

In both "commercial" and copper-bearing grades, Continental wire is made from special-analysis steel, to insure desired properties. KONIK the new patented steel containing copper, chromium, and nickel, is giving manufacturers an amazing combination of workability, corrosion resistance, case-hardening and heat-treating properties, besides economy.

● TEMPERS

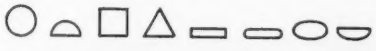
In a range of tempers from hard to dead soft, full advantage is taken of our special-analysis steel and its response to controlled sequences of heat treatment and cold working.

● FINISHES

Several types of sull coatings to meet particular needs; light, medium, and heavy galvanized coatings to give desired degrees of rust protection. Continental's bright finish provides a splendid base for plating.

● SHAPES

Continental Manufacturers Wire comes in many regular shapes such as round, half-round, oval, half-oval, square, triangular, and flat with round or square edge. Other shapes are available, and may afford economies in getting out your product.



CONTINENTAL STEEL CORPORATION
PLANTS AT CANTON, KOKOMO and INDIANAPOLIS

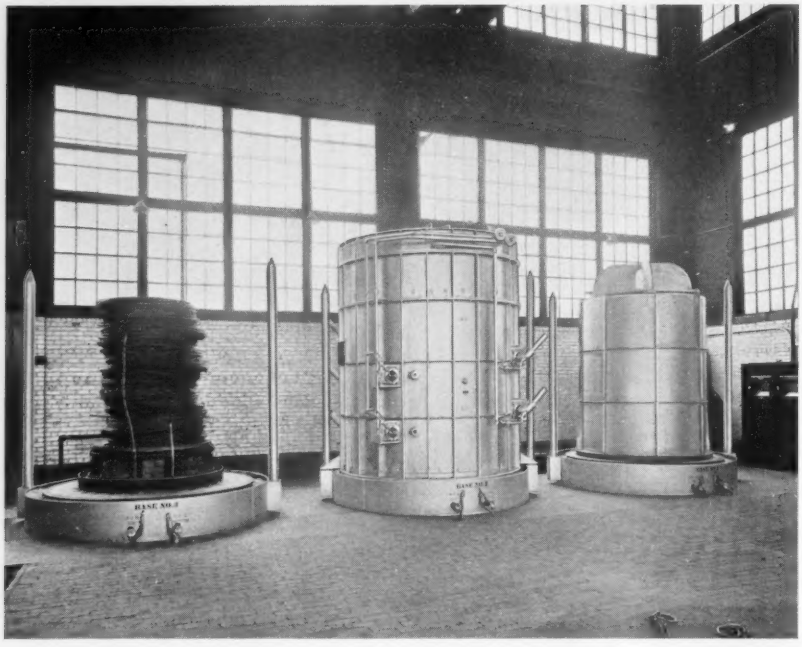
Manufacturers of

Billets and Wire Rods, Bright Basic, Annealed, Galvanized and Konik Wire; Nails, Staples.

Lawn, Chain-Link, Diamond Mesh, Farm and Poultry Fence; Gates and Fittings.

Black, Galvanized, Galvannealed, and Special Coated Sheets; Galvanized, "Seal of Quality" Roofing.

FURNACES FOR HEAT TREATING WIRE



HEAT TREATING WIRE ROD IN COILS FOR BOLT STOCK

● To assure constant and uniform quality of structure with a definitely predetermined percentage of spheroidization, steel wire rod in coils for manufacturing bolts by cold heading is heat treated in this SC Gas-Fired Annealing Cover equipped with Radiant Heating Elements.

The installation includes one SC Bell Type Annealing Furnace or Cover, three bases and a special cooling cover together with heat control valve and temperature control instruments.

Eight coils of No. 1035 steel wire rod, each weighing 730 pounds, are heated in each batch from cold to 1400°F. in four and a half hours and soaked at temperature for a half hour. Then the batch is cooled to 1000°F. under the special cooling cover while a second batch is being heated. At the same time, the third base is unloaded and reloaded for treatment. Four heats are produced daily.

Even more economical in operation than anticipated, fuel consumption is less than 1.25 cubic feet of 530 Btu gas per pound of work treated. Net thermal efficiency is 34%.

Physical properties of the work being treated meet the rigid specifications of metallurgists. Quality is exceptionally uniform.

Whether for wire annealing, hardening, patenting, or galvanizing, SC Gas-Fired Furnaces permit increased production, improved physical properties and dependable uniformity, at the same time effecting notable economies in operating costs. Write for information. SURFACE COMBUSTION CORPORATION . . . Toledo, Ohio.

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Builders of HARDENING, DRAWING, NORMALIZING, ANNEALING FURNACES FOR CONTINUOUS OR BATCH OPERATION » » » ATMOSPHERE FURNACES

Exports and Imports of Wire

(*Continued from page 334*)

up of wire rods (2,763), ingots, blooms, etc. (1,614), tin plate (762), 'other plate' (319), rail joints (137), and heavy rails (137). Next came China which received shipments totaling 6,236 tons, its trade for the most part consisting of tin plate (2,818), heavy rails (1,005), ingots, blooms, etc. (1,000), black steel sheets (824), and 'other steel bars' (214). Shipments aggregating 6,231 tons went forward to the Philippine Islands in a trade made up principally of galvanized steel sheets (2,346), tin plate (1,119), plain shapes (535), 'other plate' (376), wire nails (277), and 'other steel bars' (376). Mexico was the sixth market of importance with purchases totaling 5,322 tons in a trade involving chiefly tin plate (1,271), black steel sheets (1,098), barbed wire (450), and galvanized steel sheets (361).

✦ ✦ ✦

Imports

APRIL imports of semi-finished and finished iron and steel products (40,728 tons) declined (18 percent) from the March figure but were considerably (47.5 percent) above receipts during the corresponding month of 1935. The import trade during the first four months of the current year (169,027 tons) was sharply (81.5 percent) in advance of that moving in the corresponding third of last year.

✦ ✦ ✦

Suppliers of Iron and Steel Products to the United States During April

FIRST rank as a supplier of iron and steel products (excepting scrap) to the United States during April went to Belgium whose rather widespread trade involved 10,356 tons, in which the predominating items were shapes (3,660), 'other hoops and bands' (2,185), bars, whether solid or hollow (1,903), Rails and track material (1,420), and sheets, skelp, and sawplate (484). Germany's trade (8,725 tons) was mostly of nails, tacks, and staples (1,957), sheets, skelp, and sawplate (1,590), barb-

ed wire (1,394), 'other pipe' (912), wire rods (544), and welded pipe (374). British India's trade was entirely of pig iron (4,765 tons) as was that of Soviet Russia (4,191 tons). Canada—the fifth supplier—sent in iron and steel products to a total of 3,912 tons, of which the bulk was spiegeleisen (2,654) and pig iron (1,058). Sweden's trade of 2,486 tons was primarily of wire rods (1,053), sponge iron (306), flat wire and steel strips (231), bars, whether solid or hollow (230), and 'other pipe' (201).

✦ ✦ ✦

Imports Resume Downward Movement in April

AFTER observing an upward trend in March for the first time since November, 1935, imports of iron and steel products (excluding scrap) during April at 40,728 tons resumed a downward curve when they declined (18 percent) from the March trade. Receipts during the reviewed month, however, were at a higher level (45.7 percent) than in the corresponding one of 1935. During the first four months of 1936, the import total of 169,027 tons registered an increase (of 81.5 percent) when compared with the corresponding third of 1935.

✦ ✦ ✦

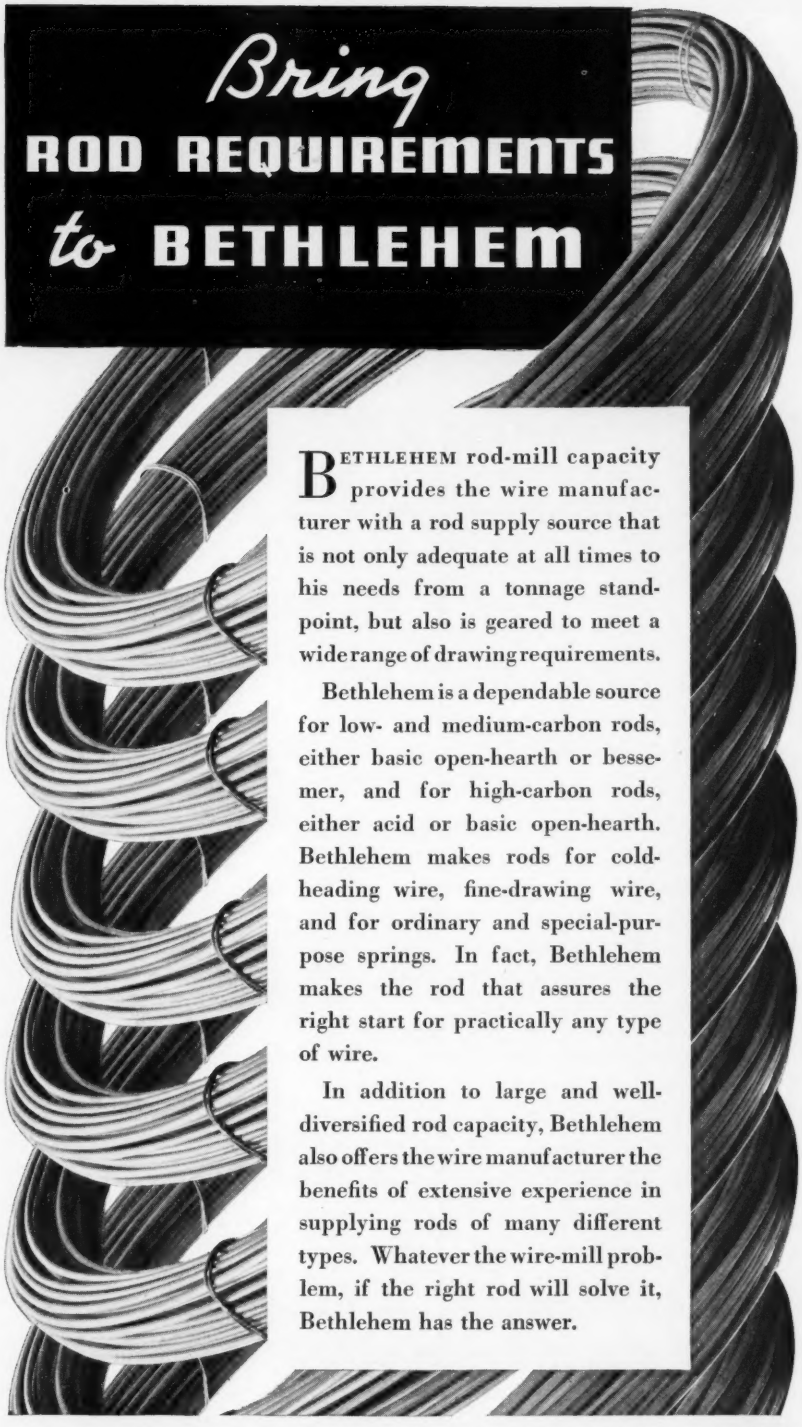
THE outstanding decline—comparing April with March — (among 18 recorded) was that in pig iron (11,761 tons), other decreases of moment occurring in 'other pipe' (905 tons), ferromanganese (674 tons), barbed wire (593 tons), and bars, whether solid or hollow (542 tons). The chief gain (in a total of 16) was registered in spiegeleisen (1,445 tons), rails and track material (1,386 tons), 'other hoops and bands' (975 tons), shapes (579 tons), and wire rods (558 tons).

✦ ✦ ✦

Pig Iron Chief Product in April Import Trade

PIG iron (as has been the case for some months past) was the leading iron and steel product imported into the United States during April from the standpoint of tonnage. The bulk of the 11,982

(*Please turn to page 349*)



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ROD REQUIREMENTS
to BETHLEHEM

BETHLEHEM rod-mill capacity provides the wire manufacturer with a rod supply source that is not only adequate at all times to his needs from a tonnage standpoint, but also is geared to meet a wide range of drawing requirements.

Bethlehem is a dependable source for low- and medium-carbon rods, either basic open-hearth or bessemer, and for high-carbon rods, either acid or basic open-hearth. Bethlehem makes rods for cold-heading wire, fine-drawing wire, and for ordinary and special-purpose springs. In fact, Bethlehem makes the rod that assures the right start for practically any type of wire.

In addition to large and well-diversified rod capacity, Bethlehem also offers the wire manufacturer the benefits of extensive experience in supplying rods of many different types. Whatever the wire-mill problem, if the right rod will solve it, Bethlehem has the answer.

Bethlehem District Offices are located at Albany, Atlanta, Baltimore, Boston, Bridgeport, Buffalo, Chicago, Cincinnati, Cleveland, Dallas, Detroit, Honolulu, Houston, Indianapolis, Kansas City, Los Angeles, Milwaukee, New York, Philadelphia, Pittsburgh, Portland, Ore., Salt Lake City, San Antonio, San Francisco, St. Louis, St. Paul, Seattle, Syracuse, Washington, Wilkes-Barre, York. *Export Distributor:* Bethlehem Steel Export Corporation, New York.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY

GENERAL OFFICES: BETHLEHEM, PA.

Second Edition — NEW AND REVISED

WIRE DRAWING

AND THE

COLD WORKING OF STEEL

By

ALASTAIR T. ADAM, A.R.T.C.

PHOTOGRAPHS, DIAGRAMS & TABLES

THE publication of the first edition of "Wire Drawing and the Cold Working of Steel" occurred over ten years ago, but in this age of technical development the progress made is so rapid that such a period is sufficiently lengthy to make any text-book out of date, and in the preparation of the second edition of this valuable work the author has not been so much surprised that much has had to be revised, or rewritten, as that any of the text could be left without modification.

✦ ✦ ✦

THE main scheme of the original edition has been retained with its intention of so presenting the subject that it may be of interest to both the wire manufacturer and the wire user. Some matter has been eliminated, but much has been added, notably an entirely new chapter dealing with typical applications of wire; and although some of the old text remains unaltered, every chapter has been completely revised and several entirely rewritten. The volume has also been re-illustrated with a large number of photographs, diagrams and tables. Thus has been brought fully up to date the author's intention to explain the real nature of cold-worked products, and to show how the physical properties required for a particular process may be obtained.

✦ ✦ ✦

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New 6" and 10" Pedestal Grinders for Carbide Tools

(*Continued from page 345*)

wheels can be used to grind on the steel shank when desired. However, in such cases, care must be used to avoid contacting the carbide tip. There are naturally other factors involved other than the four described above, such as use of proper wheels, correct machines, fixtures, etc. However, these four factors described above constitute the important features of the rapid technique demonstrated.

✦ ✦ ✦

IT is pointed out in the announcement that these new 6" and 10" grinders embody the combined specifications of over 30 cemented carbide representative requirements, plus the recommendations of Ex-Cell-O Aircraft & Tool Corp. of Detroit, who is manufacturing these grinders for Carboloy Company. A 12-page descriptive booklet may be obtained by writing the Editor, Wire & Wire Products, 17 E. 42nd St., New York, N. Y.

✦ ✦ ✦

Westinghouse Appoints McElhone To New Post

H. C. **McELHONE**, who has served in various capacities in the works, headquarters sales, stock control and executive departments, has been appointed assistant to vice president of the Westinghouse Electric and Manufacturing Company.

✦ ✦ ✦

ASSOCIATED with Westinghouse since 1919, Mr. McElhone for the past five years has been attached to the President's office. In recent months he has been in charge of Westinghouse Golden Jubilee Year activities.

✦ ✦ ✦

Lindberg Engineering Company Opens Detroit Office

ANNOUNCEMENT is made by the **Lindberg Engineering Company**, 211 Union Park Court, Chicago, Illinois, manufacturers of "Cyclone" furnaces, of the opening of a Detroit office at 7338 Woodward Avenue.

Exports and Imports of Wire

(*Continued from page 347*)

tons came from British India (4,765), Soviet Russia (4,191), the Netherlands (1,557), and Canada (1,058). Structural shapes (5,056 tons) were next in importance, and were chiefly purchased from Belgium (3,660), France (1,061), and Germany (198). Bars, whether solid or hollow (3,302)—the next product—were mostly sent in by Belgium (1,903), France (675), Germany (265), Sweden (230), and the United Kingdom (156). Practically all of the spiegeleisen imported (2,740 tons) came from Canada (2,654). Receipts of 'other hoops and bands' totaled 2,681 tons, and the trade was principally covered by Belgium (2,185), and Germany (324). Nails, tacks, and staples (2,337 tons) were received chiefly from Germany (1,967), and Belgium (281).

✦ ✦ ✦

CARD clothing receipts (25,764 square feet valued at $33,917) compared with the March trade of 22,360 square feet valued at $26,612 and were supplied by the United Kingdom (23,089 square feet valued at $29,719) and Germany (2,675 square feet valued at $4,198).

✦ ✦ ✦

WIRE cloth and screening imports (73,412 square feet) recorded a decline (14.3 percent) when compared with the March trade, and came principally from Germany (46,226), the Netherlands (14,631), and Canada (8,601).

✦ ✦ ✦

THE import trade in **fourdrinier and other paper-making wire** (56,334 square feet) gained sharply (by 41 percent), the suppliers being Germany (41,940), Austria (8,516), France (3,237), and Sweden (2,641).

✦ ✦ ✦

FURTHER momentum was gained in the **wire heddle** trade during April (1,517,000 pieces) when receipts exceeded the March total (by 136 percent). The outstanding suppliers were Germany

(*Please turn to page 352*)

ES

ELEVATOR SUPPLIES CO., Inc., HOBOKEN, N. J.

Manufacturers of

WIRE DRAWING MACHINERY

To meet all requirements for high speed production

High Speed Insulating Machines
For use with Paper - Cotton - Silk

Saturating and Finishing Equipment
For Weatherproof and Code Wire

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Take-ups - Spoolers - Coilers

Tinning Equipment

Other Equipment for Producing Wire and Cable

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In the past two or three months, Wire Mills have purchased these Duriron Company Products for use with Sulphuric, Muriatic and other acids:

Duriron Centrifugal Pumps
Durimet (Alloy Steel) Centrifugal Pumps
Duriron Y Valves
Duriron P. R. (Plunger-release) Valves
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Duriron Anodes
Duriron Circulating Steam Jets
Duriron Tank Outlets
Duriron Sink Strainers and Lab. equipment

You may have a place in your mill where Duriron Company Products will be just as valuable to you. Right now is a mighty good time to find out how this acid-resisting equipment will be of benefit to you. Free bulletins on the equipment you want will be sent you. Write today.

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FOR CARBON STEELS ▲ ▲ ▲

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As Low As
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Write for Weekly Rates and Group Rates

FAIRBAIRN, INC.

Recent Developments in Steel Wire Technology

(*Continued from page 325*)

such nature that it does not accumulate in the die at the head fillets or corners and produce imperfect blanks. In other cases, lubricants must be selected so that the cleaning procedure previous to painting, enameling, galvanizing, or tinning will properly function.

✦ ✦ ✦

THE advent of high-speed, multiple draft wire benches will apparently materially change the wire-mill lubrication problem. Soaps have a tendency to char and polymerize into "tarry" materials at the high temperature obtained with high-speed continuous machines. These tendencies are augmented or catalyzed by iron or iron oxide ("sulcoat") and the finished product may be sticky and have a coating which is difficult to remove and will accumulate in the subsequent fabricating dies and cause trouble to the operator. It is apparent then that these problems must be attacked individually according to user's conditions. Their study must be so adjusted that the manufacturer will realize high production and die life and at the same time will be able to produce a material satisfactory to the purchaser.

✦ ✦ ✦

THE factors mentioned above relative to the finished product are of course the final results of careful handling and detailed attention throughout their manufacture. In some cases, slightly off quality material can be so processed as to produce a first class product, but in every instance first quality can be ruined by neglect at every stage of manufacture.

✦ ✦ ✦

LET us now deduce the best procedure for the present-day wire producer to follow.

(1) He must gain explicit knowledge of the effect of each and every operation on the final product. These influences can only be determined by carefully set up and conducted experiments.

(2) He must secure full knowledge of the consumer's operations and requirements. These facts must be obtained by men trained in dependable observation of mechanical devices and by thorough discussion with the consumer.

(3) He must employ technical staff to obtain and correlate the necessary basic

information and to formulate a satisfactory working procedure for the operating departments of the plant.

(4) His technical staff must get the full cooperation of the operating departments in carrying out these working procedures.

✦ ✦ ✦

THESE procedures immediately suggest the idea of "tailor-made" material, which is the greatest of present day developments in the wire industry. Although practiced in other industries for many years, such has not been the case in the wire industry. These procedures further call for greater teamwork between wire producer and wire user if progress, beneficial to all, is to be maintained. A question may arise in some minds as to the cost of such "tailor-made" material. It may be answered by saying that, if information is properly obtained, correlated and cooperatively applied, the tendency is for lower cost rather than higher, inasmuch as the losses due to trial and error methods are eliminated as well as costly conferences.

✦ ✦ ✦

'Round the World With the Wire Industry

(*Continued from page 342*)

hand, local production is stated to total some 10,000 tons, annually, according to a report of the local Tariff Board which recommended a lower tariff rate for the imported product. There are about 17 local manufacturers of barbed wire, and the two largest purchase their raw material (and that for the other barbed wire producers) from an Australian steel producer (in the form of steel rods). The new duty on imported barbed wire (effective April 3, 1936) exempts from duty the United Kingdom products, but imposes a duty of 50 shillings per ton on that from Canada, and the general rate has been reduced to 160 shillings a ton. At the present time, Australian-made barbed wire (delivered into store) is quoted at £21.5.0 per ton.

✦ ✦ ✦

MAKE YOUR PLANS NOW TO COME TO THE WIRE ASSOCIATION MEETING

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USE

Bell-Mine Pulverized Lime

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It is a pure high calcium lime free from grit and gives a very slow-setting suspension. It has been time-tried and proved by many wire makers.

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New Research Associate Plan at Battelle

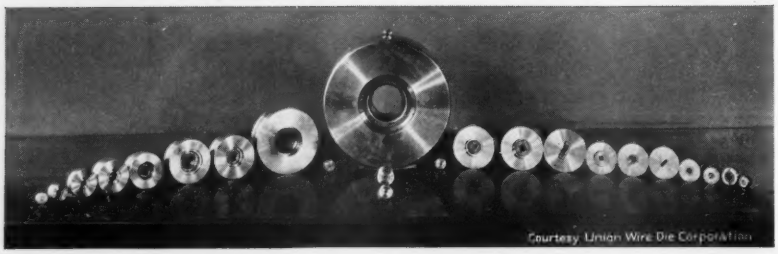
THE Trustees of Battelle Memorial Institute have announced a new plan to extend the scope and utility of the educational features of the Institute's basic program of scientific research. Since its inception, the policy of Battelle Memorial Institute has been to combine a program of fundamental research of general interest to industry with the applied research which it has carried on for individual companies and associations under its plan of sponsored research.

✦ ✦ ✦

A NEW Division of Research Associates has been established to supplement the work in fundamental science of the regular technical staff. The purpose of this new Division is to offer intensive training in practical research to the best of the younger workers in selected branches of chemistry, metallurgy, fuels and ceramics. Appointments as Research Associate will be made for one year's duration and may be extended for a second year. A Research Associate will be expected to devote his entire time to a research problem approved by the Director and supervised by members of the Institute staff. The results of these researches will be published in order to contribute information that will be useful to science and industry.

✦ ✦ ✦

APPOINTMENTS as Research Associate are open to graduates of any accredited university or college, but preference will be shown to men who have demonstrated a marked aptitude for scientific research in their industrial experience or through one or more year's graduate study. The appointment will carry an annual salary of from $1200 to $1800 depending on the training and experience of the individual. Four appointments as Battelle Research Associate will be made for the year 1936-1937.



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IN one of the largest die plants in the country in the drilling of small dies up to the point of "breaking through", Norbide abrasive has proved even more effective than diamond powder.

In the drilling and ripping of large dies No. 220 Norbide abrasive grain is also replacing silicon carbide—with great economy in time and expense.

Number 320F Norbide abrasive grain has greatly reduced the use of diamond powders in the lapping and semi-polishing operations.

N-27

NORTON ABRASIVES

Notice of Patent Issuance
Relating To
Automatic Dielectric Testing

PATENT No. 2,043,528, issued June 9, 1936, covering a system of automatic insulation resistance and dielectric testing has just been granted by the United States Patent Office to Ralph L. Davis.

THIS patent while pending in the United States Patent Office was involved in an interference with an application of the Western Electric Company.

THE R. L. Davis Electric Company, Inc., manufacturers of apparatus coming under this patent, intend to vigorously enforce rights granted under this patent against any infringers.

R. L. Davis Elec. Co., Inc.

340 CENTER ST.

WALLINGFORD, CONN.

Exports and Imports of Wire

(*Continued from page 349*)

(847,000 pieces), France (420 pieces), and the United Kingdom (200 pieces).

✦ ✦ ✦

A SLIGHT downward movement was evident in receipts of **wire fencing and netting**—galvanized before weaving—when the 529,450 square feet received declined (11 percent) from the trade in the previous month. The suppliers were Belgium (499,000), and the Netherlands (30,450). Of the galvanized after weaving grade, the trade continued its decline when the total of 495,525 square feet fell 31.6 percent from the figure reached in March. The suppliers were Belgium (326,250), and the Netherlands (169,275).

✦ ✦ ✦

EXPORTS of iron and steel wood screws during April, 1936 totaled 29,660 gross valued at $3,778. Of this total Colombia took 8,744 gross valued at $1,094; Cuba 6,601 gross valued at $752; Union of South Africa 4,576 gross valued at $521; Mexico 3,080 gross valued at $355; Philippine Islands 2,177 gross valued at $349; Chile 1,688 gross valued at $201.

✦ ✦ ✦

EXPORTS of brass wood screws during the same period amounted to 3,927 gross valued at $1,459. Of this total the Philippine Islands took 1,180 gross valued at $347; Canada 1,075 gross valued at $341; Cuba, 366 gross valued at $143; Republic of Haiti 350 gross valued at $214; Bermuda 234 gross valued at $95.

✦ ✦ ✦

IMPORTS of wood screws during the same period amounted to 62,364 gross valued at $3,743, of which amount Belgium supplied 30,800 gross valued at $1,606; Sweden 18,080 gross valued at $1,207; Japan 13,484 gross valued at $930.

Make your plans now to attend the Wire Association meetings, Cleveland, O., Oct. 19-23, 1936

Revised Simplified Practice of Iron and Steel Scrap

THE current revision of Simplified Practice Recommendation R58-28, Classification of Iron and Steel Scrap, has been accorded the required degree of acceptance by the industry, and is to become effective June 15, 1936, according to an announcement by the Division of Simplified Practice, National Bureau of Standards. The revised recommendation will be identified as Simplified Practice Recommendation R58-36, and will remain in effect until again revised by the industry.

✦ ✦ ✦

THE original recommendation, which became effective July 1, 1926, specified classes of scrap for blast, basic open-hearth, acid open-hearth, and electric furnaces for gray iron foundry practice, Bessemer converters, and for miscellaneous scrap. A contract form for purchase of scrap is also included. The revision covers certain additions and eliminations to meet current needs.

✦ ✦ ✦

UNTIL ready in printed form, complimentary copies of this Simplified Practice Recommendation, in mimeographed form, may be obtained from the Division of Simplified Practice, National Bureau of Standards, Washington, D. C.

✦ ✦ ✦

✦

PROCEEDINGS AND DISCUSSIONS of the 1935 WIRE ASSOCIATION MEETINGS

✦

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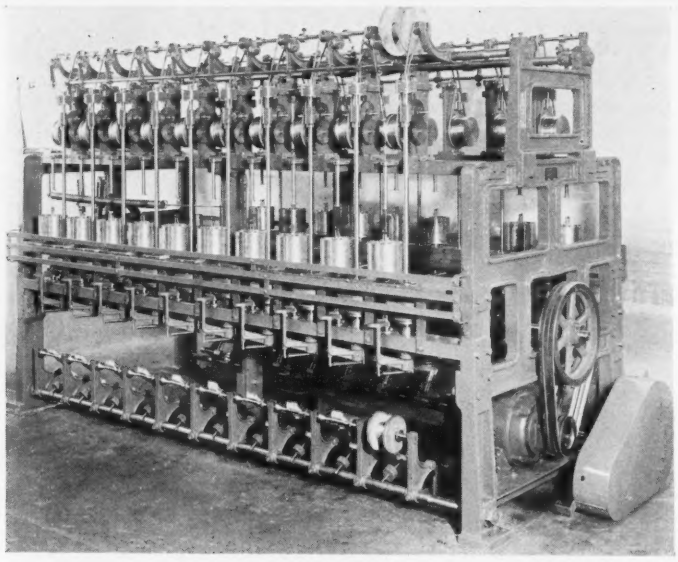

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WIRE DRAWING SOAPS

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Wire mills that have equipped their braiding machines with *Productimeters* find that machine efficiency goes up, cost of braiding goes down, and operators make better wages. Installation costs have been paid off in from 6 to 12 months.

This is a typical installation of a geared Rotary *Productimeter* on a 24 Carrier Wardwell Braider. May we send a field engineer to estimate your requirements? For information on wire measuring machines send for Bulletin 3.

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180 Eddy St. Providence, R. I.

Productimeters
THE SPEEDOMETERS OF INDUSTRY

Learn about PARALAN

Paralan will give your finished wire and wire products protection from atmospheric corrosion in the mill and in shipping. Paralan-coated wire can be spot welded or soldered without cleaning. Also, Paralan leaves surfaces in good condition for all types of finishes—enameling, japanning, lacquering, plating, etc.

Write for further information. We may be able to solve your difficulties.

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DESIGNERS AND MANUFACTURERS
OF EQUIPMENT FOR
THE WIRE MILLS AND SPRING MAKERS

THE MACHINES THAT PUT THE 'RINGS' IN 'SPRINGS'

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TORSION SPRING MACHINES
FLEXIBLE CASING AND
FLEXIBLE METALLIC TUBE COILERS

AUTOMATIC AND HIGH SPEED SPRING COILING
AND WIRE MILL EQUIPMENT

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BALLOFFET

The Quality Diamond Dies

1870 1936

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PATENT LAW OFFICES

Suite 438, Bowen Building 815-15th St., N.W. Washington, D. C.

Heat Treating Steel Wire Rods in Coils for Bolt Stock

(*Continued from page 333*)

being heated, the second is cooling, and the first is being removed from the base and that base is reloaded. Thus a cycle is completed and a new one started.

✦ ✦ ✦

DATA on a typical heat is as follows:

Charge: 8 coils	5830 lbs.
Spindle	730 lbs.
Gross work to be heated	6560 lbs.
Time required to heat, Cold to 1400° F.	4 hrs. 25 min.
Soaking time	½ hr.
Total gas consumed (530 B.T.U.)	10,488 cu. ft.
Net efficiency	23%

Four heats are being produced daily.

✦ ✦ ✦

AMONG the factors to be considered in the design of this installation was the existing crane equipment which had a maximum capacity of 24,000 lbs., replacement of which was an expense to be avoided. The annealing cover as installed weighs approximately 19,750 lbs. Overhead clearance of 18 feet 7 inches is necessary to permit lifting the cover 7 feet 2 inches above its height of 11 feet 5 inches.

✦ ✦ ✦

THE radiant tube heating elements can be controlled individually and independently. The long radiant flame produced by the burners inside the tubes is radiated through the tube walls without excessive temperature differential. Work produced by this installation is meeting all requirements for structure and uniformity in quality, and the operation is exceptionally economical.

✦ ✦ ✦

THE furnace was designed and built by Surface Combustion Corporation of Toledo, Ohio.

Manufacturers of materials, tools and equipment for wire drawing and forming plants are constantly making improvements and additions to their lines. If you do not find the product or service in which you are interested additional information will be supplied promptly. Simply address:

WIRE & WIRE PRODUCTS
17 East 42nd Street
New York City

STEEL WIRE

By MAURICE BONZEL

Translated and Published by Kenneth B. Lewis Consulting Engineer

Price $15.00

A reviewer for "Metal Progress" says:

THIS is the one complete book that discusses the manufacture of wire from the viewpoint of modern physical metallurgy. Hence the price is not excessive. When the purchaser has spent his $15 he has half the scientific library of the industry.

M. Bonzel, the author, is rarely placed. An engineer by education who got his metallurgy under Leon Guillet, he is general manager of the wire mills of Etablissements Bohin. He is fortunate in having an inquiring mind; he respects the traditional lore of the industry but studies each of its practices, and by combined laboratory and plant tests decides what is essential, what is non-essential and harmless, and what is positively detrimental to a good product. Probably he is not unique in this attitude of mind; there are doubtless many other inquiring souls in his industry. He is almost unique, however, in having a disposition plus the permission to share this information with his competitors and the public. . . . . It is to be hoped that the appearance of this work marks the end of an epoch wherein the heat treaters and wire men have been sneering at each other. The metallurgists were taunting the wire men for various illogical rule-of-thumb practices, and the wire men were snickering at the metallurgists for advocating changes that were apparently sound in theory but for occult reasons won't work on wire. Bonzel, the author, and Lewis, his translator, are both men who are broad-minded enough to see both sides of such situations. More power to their clan.

495 pages. 414 illustrations

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Beryllium-Copper Wire Has Unique Characteristics

(*Continued from page 327*)

spring steels. However, where nonmagnetic precision springs are in demand, beryllium-copper is the most suitable. It possesses a high resistance to creep, affording satisfactory calibrations over long periods of time. In precision springs, the stability of beryllium-copper permits working stresses higher than can be used with phosphor-bronze.

✦ ✦ ✦

THERE is a potential application of beryllium-copper wire in the replacement of long lengths of phosphor-bronze wire, used in certain antenna installations. The phosphor-bronze wire has been known to fail in a comparatively short period of time, a fact which should turn attention to beryllium-copper alloy.

✦ ✦ ✦

IT is frequently desirable to anneal beryllium-copper prior to forming operations. The annealing will place the alloy in its softest state. It is accomplished by heating to 800° Centigrade for about an hour and immediately quenching in cold water. For certain operations, a longer period of annealing is required, but the effect of softening is the same. This property has been made use of in weaving cloth of small beryllium-copper wires, which had previously been annealed after cold-working. The usual heat treatment is applied to the finished product to produce a stiff and strong cloth, with high mechanical strength. From this example, one can realize the possibilities of working the metal in a soft state, and by heat treatment of the final product achieve the required strength.

✦ ✦ ✦

IT is with a great deal of satisfaction that metallurgists view the growing applications of beryllium-copper. The alloy is a result of intensive research against many obstacles, which brought forth new developments and refinements in metallurgical technique.

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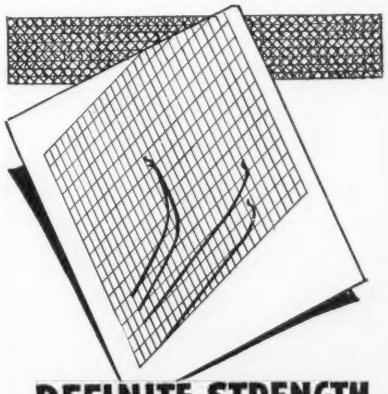

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Importing of Widia Cemented Carbide Cutting Tool Material To be Discontinued

ANNOUNCEMENT has been received that effective May 15, 1936, the Fried. Krupp Works of Essen, Germany, discontinued importation of Widia cutting tool material into the United States. This arrangement does not affect the importing of Widia Cemented Carbide for Drawing and Extrusion Dies.

✦ ✦ ✦

FOR the past eight years Thomas Prosser & Son of 15 Gold Street, New York City, have been distributors for the United States and Canada of Widia Cemented Carbide Cutting tool materials for the Fried. Krupp Works. As agents for Krupp, Prosser are discontinuing the sale of Widia blanks, tools and parts thereof, as of the same date.

✦ ✦ ✦

THEY will, however, continue their other business, the same as they have in the past.

✦ ✦ ✦

IN order that Prosser's Cemented Carbide customers may continue to be served, Prosser has made satisfactory arrangements with the Carboloy Company, Inc., of Detroit, Michigan, manufacturers of Carboloy cemented carbide tools and dies, and word has been received from the Carboloy Company that on May 16, 1936, they took over the cemented carbide tool business of Thomas Prosser & Son, including their inventory of Widia metal and the greater part of the Prosser sales organization handling the Widia line.

✦ ✦ ✦

THE announcement states that arrangements have been made to handle all business turned over from Prosser & Son to Carboloy Company, Inc., under the same prices, terms and conditions of sale as existed under Thomas Prosser & Son. Carboloy Company, Inc., will continue to furnish, on request, all current grades of Widia until the former Prosser Inventory is exhausted. Following depletion of the Prosser inventory of Widia metal, equivalent grades of Carboloy cemented carbide will be supplied. It is stated that present users of Widia can, of course, obtain Carboloy grades immediately when desired.

✦ ✦ ✦

CEMENTED carbides are at present manufactured and sold in the United States by several suppliers, who, in addition to the manufacture and sale of carbide blanks and carbide tipped tools, also supply hardened blanks to numerous tool makers who sell their own tools equipped with carbide tips. Arrangements have also been made with practically all machine tool builders to sell carbide tools as original equipment on their machines.

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Hydraulic Press Lecture

AT a meeting of the Providence Engineering Society held at the Engineering Society Building, 195 Angell St., Providence, on Thursday, May 7th, Walter L. Tann, Hydraulic Engineer of Farrel-Birmingham Company, Inc., of Ansonia, Conn., addressed the members on the subject of "Hydraulic Presses and other Applications of Hydraulic Power."

✦ ✦ ✦

HIS talk, which was illustrated by numerous lantern slides, dealt with the uses of hydraulic power from early times and its gradual development to a rapidly expanding number of applications by modern industry, including hydraulic presses for the molding of rubber and plastics and the forming of metals, hydraulic elevators for such purposes as theater stages, the hydraulic machinery used aboard naval vessels and various other uses.

✦ ✦ ✦

MR. Tann was assisted by Mr. E. H. Johnson, another engineer of the Farrel-Birmingham Company. In the discussion following the lecture both Messrs. Tann and Johnson were called upon to answer many questions pertaining to hydraulic press design and operation, and the problems encountered in various applications of hydraulic power.

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Vianney Wire Die Works, New York, N. Y.

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MACHINERY—Special
American Insulating Mach'y Co., Phila. Pa.
Elevator Supplies Co., Inc., Hoboken, N. J.
Broden Construction Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry and Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Special—Combination Machine for Drawing, Cutting-to-length, Straightening and Reeling Bars from Coil in One Operation (Shumag Type)—
W. A. Schuyler, New York, N. Y.

MACHINERY—Spooling
American Insulating Machinery Co., Phila.
Elevator Supplies Co., Inc., Hoboken, N. J.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.
Watson Machine Co., Paterson, N. J.

MACHINERY—Spring Making
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Staple
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Straightening
Broden Construction Co., Cleveland, O.
Hallden Machine Co., Thomaston, Conn.
H. J. Ruesch Machine Co., Newark, N. J.
W. A. Schuyler, New York, N. Y.
F. B. Shuster, New Haven, Conn.
Sleeper & Hartley, Inc., Worcester, Mass.

MACHINERY—Stranding
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

BUYERS' GUIDE, Continued

MACHINERY—Strip Steel
Broden Const. Co., Cleveland, O.
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Swaging
Elevator Supplies Co., Inc., Hoboken, N. J.
H. J. Ruesch Machine Co., Newark, N. J.
Sleeper & Hartley, Worcester, Mass.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Taping
Amer. Insulating Mach. Co., Phila., Pa.
Elevator Supplies Co., Inc., Hoboken, N. J.
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Testing Size of Wire
R. L. Davis Elec. Co., Wallingford, Conn.

MACHINERY—Testing Wire
Henry L. Scott Co., Providence, R. I.

MACHINERY—Tinsel Rolling Mills
Amer. Insulating Mach'y Co., Phila., Pa.
Elevator Supplies Co., Inc., Hoboken, N. J.

MACHINERY—Trolley Wire
Vaughn Machinery Co., Cuyahoga Falls, O.

MACHINERY—Tube Mill
H. J. Ruesch Machine Co., Newark, N. J.

MACHINERY—Welding Wire
Micro Products Co., Chicago, Ill.
F. B. Shuster Co., New Haven, Conn.
Thomson-Judd Wire Machinery Co., Lynn, Mass.

MACHINERY—Winding
American Insulating Mach'y Co., Phila., Pa.
Elevator Supplies Co., Inc., Hoboken, N. J.
New England Butt Co., Providence, R. I.
Sleeper & Hartley, Inc., Worcester, Mass.
Watson Machine Co., Paterson, N. J.

MACHINERY—Wire Drawing
American Insulating Machinery Co., Phila.
Broden Const. Co., Cleveland, Ohio.
Elevator Supplies Co., Inc., Hoboken, N. J.
Morgan Construction Co., Worcester, Mass.
H. J. Ruesch Machine Co., Newark, N. J.
E. J. Scudder Foundry & Machine Co., Trenton, N. J.
W. A. Schuyler, New York, N. Y.
Sleeper & Hartley, Inc., Worcester, Mass.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.
Waterbury-Farrel Foundry & Machine Co., Waterbury, Conn.

MACHINERY—Wire Rope
New England Butt Co., Providence, R. I.
Thomson-Judd Wire Machinery Co., Lynn, Mass.
Watson Machine Company, Paterson, N. J.

MACHINERY—Wire Tinning
American Insulating Mach'y Co., Phila., Pa.
Elevator Supplies Co., Inc., Hoboken, N. J.

MACHINERY—Wrapping Wire
W. A. Schuyler, New York, N. Y.

MATERIAL HANDLING EQUIPMENT—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

MONORAIL SYSTEMS—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

NICKEL SILVER AND PHOSPHOR BRONZE—Rod, Wire and Strip
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

OVENS—Annealing or Drying
Lindberg Engineering Co., Chicago, Ill.
Ross Engineering Corp., New York, N. Y.

PAPER—Insulating
E. W. Twitchell, Inc., Phila., Pa.

PICKLING COMPOUNDS—
American Chemical Paint Co., Ambler, Pa.
Delany Chemical Co., Tacony Station, Philadelphia, Pa.
Parkin Co., The Wm., Pittsburgh, Pa.

PICKLING—Tank Linings
American Hard Rubber Co., New York, N. Y.

POTS—Annealing, Case Hardening and Tempering
Lindberg Engineering Co., Chicago, Ill.

POTS—Lead Melting
Farrel-Birmingham Co., Ansonia, Conn.
John Robertson Co., Brooklyn, N. Y.

PRESSES—Hydraulic and Mechanical
Farrel-Birmingham Co., Ansonia, Conn.
John Robertson Co., Brooklyn, N. Y.

PRESSES—Lead
John Robertson Co., Brooklyn, N. Y.

PULLERS—Wire
E. J. Scudder Fdry. & Machine Co., Trenton, N. J.
Sleeper & Hartley, Inc., Worcester, Mass.

PUMPS—Hydraulic
John Robertson Co., Brooklyn, N. Y.

REEL AND TENSION STAND—
Sleeper & Hartley, Inc., Worcester, Mass.

REEL CRUTCHES
Watson Machine Co., Paterson, N. J.

REELS—Annealing and Stranding
Mossberg Pressed Steel Corp., Attleboro, Mass.

REELS—Impregnating
Mossberg Pressed Steel Corp., Attleboro, Mass.

REELS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.

REFRACTORIES—High Temperature
Norton Co., Worcester, Mass.

ROD BAKERS—
Morrison Engineering Co., Cleveland, O.

RODS—Wire—Non Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Seymour Mfg. Co., Seymour, Conn.

RODS—Wire—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Laclede Steel Co., St. Louis, Mo.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

ROLLS—
Farrel-Birmingham Co., Ansonia, Conn.

RUST PROOF COMPOUND
American Lanolin Co., Lawrence, Mass.

SHEET—Steel
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Superior Sheet Steel Co., Canton, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SOAPS—Wire Drawing
Gore, T., Brooklyn, N. Y.
R. H. Miller Co., Homer, N. Y.

SPOOLS—Steel
Mossberg Pressed Steel Corp., Attleboro, Mass.

STRIP—Brass, Zinc and Non Ferrous
Hudson Wire Co., Ossining, N. Y.
Platt Bros. & Co., The, Waterbury, Conn.
Seymour Mfg. Co., Seymour, Conn.

STRIP—Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Firth-Sterling Steel Co., McKeesport, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.

TANKS—Compound
Watson Machine Co., Paterson, N. J.

TESTERS—Wire
Henry L. Scott Co., Providence, R. I.

TRAMRAIL SYSTEMS—
Cleveland Tramrail Div. of The Cleveland Crane & Engineering Co., Wickliffe, O.

TREADS—Safety
Norton Co., Worcester, Mass.

TRUCKS
Morgan Construction Co., Worcester, Mass.
Vaughn Machinery Co., Cuyahoga Falls, O.

TUBE BENDERS AND FORMERS
H. J. Ruesch Machine Co., Newark, N. J.

VALVES AND FITTINGS—Acid Proof
Duriron Co., The, Dayton, O.

VULCANIZERS
Watson Machine Co., Paterson, N. J.

VULCANIZING PANS
American Insulating Mach'y Co., Phila., Pa.

WIRE—Cold Heading
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Laclede Steel Co., St. Louis, Mo.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Youngstown, O.
Youngstown Sheet & Tube Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.

WIRE—Electric
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Enameled For Coils
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Manufacturers
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Co., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Laclede Steel Co., St. Louis, Mo.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio

WIRE—Nickel Silver and Phosphor Bronze
Hudson Wire Company, Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.

WIRE—Non Ferrous to Specification For Special Purposes
Hudson Wire Co., Ossining, N. Y.
Seymour Mfg. Co., Seymour, Conn.
Winsted Div. of Hudson Wire Co., Winsted, Conn.

WIRE—Spring
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel and Wire Co., Peoria, Ill.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Seymour Mfg. Co., Seymour, Conn.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE—Steel—Also Coppered Steel—Also Galvanized Steel
Bethlehem Steel Co., Bethlehem, Pa.
Continental Steel Corp., Kokomo, Ind.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keystone Steel & Wire Co., Peoria, Ill.
Laclede Steel Co., St. Louis, Mo.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Co., Youngstown, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, Ohio.

WIRE AND STRIP—Brass, Zinc
Platt Bros. & Co., The, Waterbury, Conn.

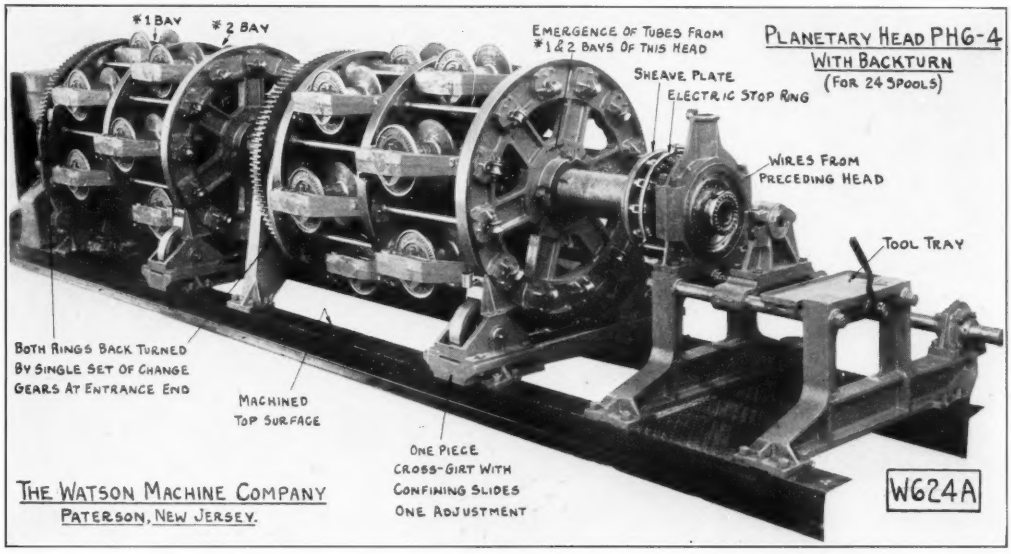
This is a carefully classified index of concerns who specialize in this industry and who advertise regularly in WIRE & WIRE PRODUCTS. Please mention WIRE when writing to these firms.

THE WATSON MACHINE COMPANY

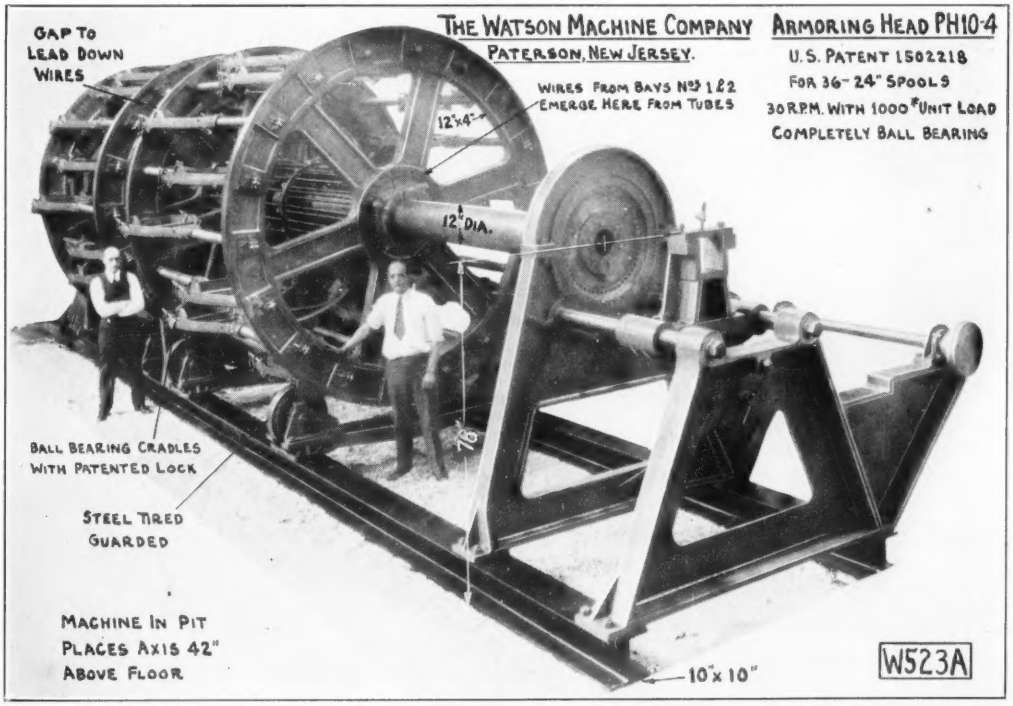
ESTABLISHED 1845

PATERSON, NEW JERSEY, U. S. A.

ENGINEERS - FOUNDERS - MACHINISTS


#1 BAY
#2 BAY
EMERGENCE OF TUBES FROM #1 & 2 BAYS OF THIS HEAD
PLANETARY HEAD PH6-4
WITH BACKTURN
(FOR 24 SPOOLS)
SHEAVE PLATE
ELECTRIC STOP RING
WIRES FROM PRECEDING HEAD
TOOL TRAY
BOTH RINGS BACK TURNED BY SINGLE SET OF CHANGE GEARS AT ENTRANCE END
MACHINED TOP SURFACE
ONE PIECE CROSS-GIRT WITH CONFINING SLIDES ONE ADJUSTMENT
THE WATSON MACHINE COMPANY
PATERSON, NEW JERSEY.
W624A

PLANETARY HORIZONTAL STRANDING HEADS in 100, 250 and 500 pound series; for 6, 12, 18, 24, 30 and 36 spools in each series. All Anti-Friction Bearings (including Cradle Necks), with positive elimination of spool side-slap allowing highest speeds. Automatic stops and brakes, low wire lead angles, positive locks preventing operation with unlocked spools. Lang lay attachment at low extra cost.

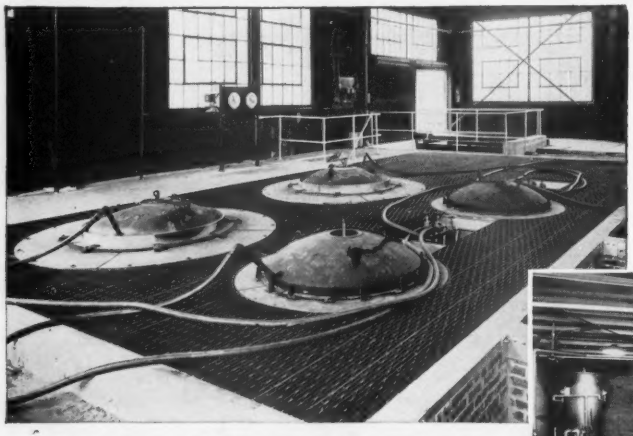

GAP TO LEAD DOWN WIRES
THE WATSON MACHINE COMPANY
PATERSON, NEW JERSEY.
ARMORING HEAD PH10-4
U.S. PATENT 1502218
FOR 36-24" SPOOLS
30 R.P.M. WITH 1000# UNIT LOAD
COMPLETELY BALL BEARING
WIRES FROM BAYS Nos 1 & 2 EMERGE HERE FROM TUBES
12"x4"
12" DIA.
BALL BEARING CRADLES WITH PATENTED LOCK
STEEL TIRED GUARDED
MACHINE IN PIT PLACES AXIS 42" ABOVE FLOOR
10"x 10"
W523A

PLANETARY HORIZONTAL ARMORING HEADS in 500 and 1000 pound series, for up to 54 spools in each series. Same construction as on Stranding Heads.

Bright Annealing Wire

AND

Normalizing and Spheroidizing Rod



Above—A recent installation for annealing wire in coils—other similar installations have been made for normalizing and spheroidizing rod, bright annealing wire, etc.

Below — The "Elfurno" Gas Generator shown at left of the picture below provides the special atmosphere used in this equipment for bright annealing steel wire in coils.

● Another Installation

Another new three-battery combination unit, similar to the illustration above, was recently installed for normalizing or spheroidizing rod and bright annealing wire. This installation (shown in lower left corner of this page) is also equipped with an "Elfurno" generator for control of surface condition on both rod and wire. Rod and wire can be handled in the same unit.

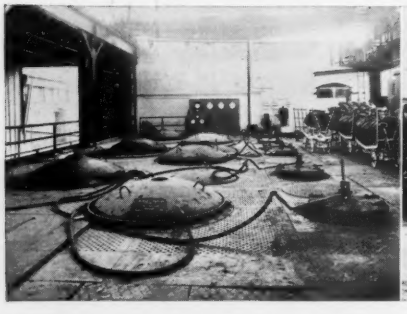
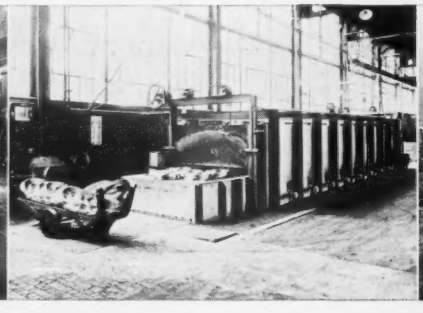
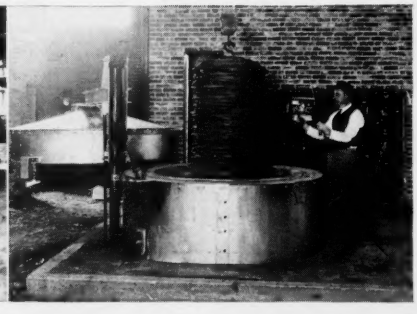
● Advantages And Savings

Other advantages include: Increased tonnage per pit. Improved fuel economy. More uniform anneal. Improved surface condition. Lower maintenance cost. Decreased annealing time and labor requirements. Maximum flexibility—produces a bright surface, semi-bright or otherwise, as desired.

● Other Outstanding Installations

Several similar installations have been made for normalizing and spheroidizing rod and arranged for controlled atmosphere for bright and clean annealing wire.

We have also recently made a number of other outstanding continuous and semi-continuous installations for clean and bright annealing ferrous and non-ferrous products, including tubing, sheet, strip, stampings, wire; for copper brazing miscellaneous assemblies and for scale-free heat treating bolts and other finished products.

We specialize on building Electric and Fuel Fired Furnaces and time and labor saving auxiliary equipment to suit the customer's specific requirements. Send for printed matter showing some of our latest designs.

The Electric Furnace Co., Salem, O.